On January 28th, Biotility hosted the first in a series of Bioscience Educator Forums. These forums are meant to provide an opportunity for teachers to connect and share their best practices for a variety of subjects that are relevant to the bioscience classroom. Each forum begins with a Q&A session featuring a panel of bioscience educators, followed by an informal discussion facilitated by the Biotility staff. For this first forum, the topic of discussion was applied mathematics in the bioscience classroom, as Biotility receives quite a few questions each year on how to approach this topic. Joining us were three panelists: Kathy Savage from Oviedo High School, Dierdre Gruman-Walsh from Apopka High School, and Michelle Dowell from Palmetto High School. The following is a summary of the Q&A portion of the forum.

Question: What are your best practices for applying math in the bioscience classroom? What features make them effective in the classroom?

Overall, the panelists agreed that there were two things that contribute to their students' success in applied mathematics. The first is that they suggest that you start emphasizing the importance of the applied math terminology, units, and concepts as soon as you can even if the students are in the first year of their bioscience program. The second is that applied math is incorporated regularly. Most of the panelists identified that they incorporate math at least weekly, if not daily, regardless of whether it relates to the content that will be covered on that day. Dierdre identified that she uses math problems as her "bell work" questions, and Michelle added that she has her students create flashcards with her daily work so that they can use them to quiz themselves.

Both Kathy and Michelle said they stress the importance of applied math to their students by making it a substantial part of their grade. For example, Kathy makes the applied mathematics objectives worth 15% of their overall grade in the class. They both implied that by making it a significant part of their grade, the students place greater emphasis on comprehending the concepts.

It was also suggested to incorporate applied math problems into every assessment. This not only demonstrates the importance of the applied math objectives, but that these concepts will be applied throughout the school year. As Dierdre makes a great point to her students by saying, "... I'm not teaching you something for right now, I'm teaching for longevity."

Question: What advice would you give to a brand-new teacher who needs to incorporate math into their curriculum and why?

The panelists emphasized the importance of communication with your team members. They suggest that ask your team members for all curricular alignment documents or curriculum guides for your own courses and the pre-requisite courses. You should familiarize yourself with your own content, but also the content in the pre-requisites so you can check on the student's prior knowledge and discover potential knowledge gaps. They also suggest that you communicate with your team members to discover any tips or tricks they may have learned over the years as well as the methodology used to teach various concepts.

Most importantly, they emphasize that you should not be fearful of teaching math in the bioscience classroom and to remember that most of the math is not considered high-level. They encourage you to never give up.

Question: Do you feel that your students enter your classroom with an aversion to applying math in the science classroom? If so, how do you assist them with overcoming this aversion?

Overwhelmingly, they agreed that the students enter the classroom with this aversion, and they had several tips to combat this. First, they suggest that you emphasize the importance of math in the science classroom. Kathy explained that she tells her students that "…math is the tool that holds it all together and gives it meaning… ". Second, they suggested to remind your students that they are usually completing much higher-level math work in their regular math classes than in your bioscience classroom. Since they are in those higher-level math courses, then they can certainly complete the math needed for your classroom. Finally, the panelists agreed that the greatest suggestion they have is to earn the students' trust by showing them that you are there to help them achieve each milestone in applied mathematics, and you will celebrate each success with them. Kathy periodically gives her class a pop-quiz with questions she knows they have achieved just to show them how far they have come.

Question: Let's say I have a student who is struggling with the applied math more than my other students. How do I reach this student before they really fall behind?

The panelists had three main suggestions for this issue. Kathy says that she gets to know her students before they step into her classroom by doing some research regarding their math levels. She uses this information so she can try to identify students who may struggle sooner rather than later. Another suggestion was to utilize and promote after school tutoring programs at your school especially any after school tutoring that focuses on math assistance. A final suggestion came from Deirdre. She said that she uses differentiation techniques in her classroom to assist her struggling students. For example, she may give a student a slightly different question during bell work. This question might ask them to focus on completing the first step of the question such as identifying the units within the question. Once they completed the first step, she uses the bell work time to guide them through the rest of the problem.

Question: Have you tried partnering with a math teacher to address your students' math needs? How did it go?

While Dierdre and Michelle stated that they had not tried working with a math teacher, Kathy said that years ago she worked with a fellow statistics teacher to assist her with the applied mathematics concepts; she now works with a fellow chemistry teacher. At her school, the students are usually enrolled in chemistry and her class at the same time. By working with the chemistry teacher, she can align concepts like conversions, significant figures, etc., so that the students see these concepts reinforced in both classes.

Our next forum is on April 29, 2020 at 6pm EST. We will focus on how to build, and make the most of, an advisory board for your bioscience program. Hope to see you there!