



Upper School Parents' Association Meeting Minutes October 15, 2018

Upper School Parents' Association Executive Committee Members Present:

- Leah Goldberg
- Libby Albright
- Claire Walton

Featured speakers:

Julie Seplaki, Science Department Chair

Heather Sugrue, Mathematics Department Chair

- President's Welcome - Leah Goldberg
Meeting was called to order at 8:16 a.m.

I. Julie Seplaki, Science Department Chair

Julie gave background on herself and the department. She holds a bachelor's degree in environmental science and a master's degree in public health with a focus on program planning and health education. Her teacher training credential is in secondary science. She has taught for 20 years, starting in the U.K. and then in California, Connecticut, and finally at Milton Academy. In addition to teaching biology, chemistry, and anatomy and physiology, Julie has coached soccer and basketball and lived in a dormitory for 15 years. The science department consists of 21 scientists who, like Julie, also have other roles within the community.

Department Mission

The mission of Milton's science program is to "learn by doing", and this inquiry based approach is what distinguishes Milton's science program from other college preparatory programs. The focus is on giving students access to opportunities to explore science, and helping them use the tools acquired to develop ideas and design experiments. The goal is for students to not only study science, but to think critically about where data comes from and articulate their understanding.

Enrollment and courses:

- There are 702 total students in the upper school and 742 are enrolled in science courses. This indicates that some students take multiple science courses over an academic year.

- Levels of science courses offered in the core program include advanced biology, chemistry, physics, and environmental science. There is honors level chemistry and biology. Physics is taken in the Class 4 year and there is no honors level physics course.
- 15 semester and half courses are offered and can be found online. They include organic chemistry, molecular genetics, and geology.

Approach to inquiry based learning:

- Central to the inquiry based practice is students conceptually building their understanding, and developing their critical thinking skills and competence in the laboratory in order to design their own experiments. The goal is to take these tools and “make them their own”.
- Divergent thinking and using collaborative approaches to problem solving is currently happening in the classroom, but a constant goal is to develop the creative side and think “outside the box” to innovate and find solutions.
- An interdisciplinary approach that involves the math, computer science, and/or art departments integrates tools from these other disciplines to improve work as scientists.
- In order to create a significant learning experience for students, variables such as skill building and challenges come into play. Optimal flow occurs in the classroom when skills are well developed and challenges are high. Challenges often exceed a student’s perception of his/her ability, so he or she is pushed to exceed their own expectations.

Personal skills developed in students:

- Innovation
- Critical thinking
- Grit / failing forward
- Collaboration
- Effective communication - oral and written
- Creativity
- Ability to access and analyze information
- Solitude and reflection

Faculty development and commitment to learning:

- Attendance and participation at conferences.
- Nonstop engagement in curriculum design and improvement.
- Observation of each other and reflection on their own practices.
- Field work and DOT (Designing Our Tomorrow) collaborations.

Engagement of students beyond Milton Academy:

- Access to Beth Israel Deaconess Medical Center simulation lab and visits with a Massachusetts General Hospital transplant surgeon.
- Meetings with scientists at Harvard and MIT.
- Opportunities to host science students from The Perse School in the U.K. who come for one week in April and shadow our students.

II. Heather Sugrue, Mathematics Department Chair

Heather came to Milton in 2001 and is in her sixth year as Chair of the math department. Prior to this role she ran Hallowell House for 12 years where she continues to advise, and she remains involved in the Community Engagement program.

Students and faculty:

- Goals for students, similar to the science department, include fostering creativity and the idea that anyone can do math. Continuous exploration, questions, and digging using the tools we have is more important than fast processing.
- The faculty consists of 19 teachers and a Penn teaching fellow.

Course requirements and offerings:

- Geometry and Algebra II (2 years) are required, but most students take 4-5 years of math.
- Calculus is helpful in college admissions for students interested in math, engineering, or science.
- Strong interest in Statistics has resulted in eight sections this year. Statistics is very helpful and interest in this space continues to grow.
- Most freshmen start with Geometry and within this program is a three week introduction to Java. The computer science department supports this unit and it takes place in their newly renovated space.
- Algebra I with Geometry is offered for incoming students who have only had 1/2 year of Algebra I at their previous school, then they proceed to Algebra II with their peers.
- Advanced courses include Abstract Algebra and Group Theory, Multivariable Calculus, Advanced Calculus and Mathematical Statistics, Advanced Statistical Methods, and new semester courses called Advanced Topics in Mathematics.
- Independent study is an option for students who have completed available advanced courses.

Department goals:

- Support student interest in math through advanced courses, math club, math team, and other math events.
- Create further links to computer science and robotics.
- Build connections amongst math educators in the Boston area. Milton hosts a K-12 math educators conference annually in March, with keynote speakers and small presentations.
- Expand the notion of what it means to be good at math. Emphasize exploration, asking good questions, and interacting with peers over processing speed.
- Offer more choice in courses such as “flavors” of Precalculus with embedded themes such as programming. In addition, offer more half courses such as number theory, puzzle solving, and history of math.
- Cater to students in different sections of the same course while keeping core content the same. This could entail varying the pace or assigning different homework to different sections in order to meet students where they are.
- Assist students with standardized tests by recommending the proper calculator and building practice time into the schedule.
- Expand inter-disciplinary connections across departments. For example, the creation of a course in honors calculus with applied economics last year focuses primarily on calculus but the framing is microeconomics. Discussions have also taken place on math/art options and a statistics/humanities course.
- Hire and retain excellent faculty that can support students in a variety of ways.
- Stay in contact with graduates who continue to study math and get feedback on their preparedness and progress.

III. Questions and Comments

A parent asked how the math and science departments help students connect the dots between work done in the classroom and real world jobs and opportunities. Julie responded that connections begin with conversations between student and teacher, at which time a course can begin to be charted for that student without steering him/her too specifically. As students build their foundation they can use case studies in the classroom to apply their understanding. Connections can continue with engagement in the community beyond Milton, such as visits to MGH, discussions with professionals about their career paths, and exchange programs. Students are encouraged to advocate for themselves and talk to faculty about possibilities in the fields of math and science.

A question was asked about if and how students are advised on next steps when choosing future courses. Teachers are encouraged to discuss course options with their students given the experiences they have had. A question and answer session or table at lunch where students can approach science and math faculty to discuss their courses are both possibilities being discussed. Course offerings are not currently discussed at assemblies.

Parents asked about teacher availability and whether office hours are a possibility. The schedule is not built to accommodate office hours right now. Science teacher schedules and the duty person's open lab hours are posted in the hallway.

Julie elaborated on open lab in the science department. Open lab is designed for students to continue classroom work. They can run experiments, collect data, and collaborate with their lab partners. Hours are Sunday - Thursday from 7-9 pm and Monday - Friday from 3-5 pm. It is staffed by a member of the science department in all disciplines throughout the week, and is open during the school day unless the department is meeting. Opportunities exist for independent projects.

A parent requested that Julie discuss the difference between the Biology and Honors Biology courses. Honors Biology uses primary scientific literature to apply concepts, so students are expected to dissect this literature in order to apply their understanding of concepts introduced. While the content parallels each other, the Honors Biology lab work involves statistics and more challenging open-ended questions. There is also less scaffolding in the inquiry based approach. By nature, students need to spend more time trouble shooting in initial investigations and refining final protocols before they are run in the lab. The pace is faster in the honors course as well.

Information was requested on AP/Subject tests and homework in the math and science departments.

- 1. AP and Subject Tests:** Heather replied that AP designations were removed from math courses 6-7 years ago. Many students were not choosing to take the AP exam, and the AP program through the college board was also mandating a lot about curriculum which was undesirable. 15-20 students may choose to take the Calculus AP exam each year, but beyond a possible course credit colleges are doing less with it. Regarding subjects tests, one math test is usually enough and Math 2 is recommended following a year of Precalculus. The science department does not offer AP courses. While approximately 15 students take AP tests each year, they are not encouraged to take an AP exam in order to place out of a college class. Subject tests can be taken in Chemistry and Biology, and students who wish to take one are advised to do so immediately following completion of that course.
- 2. Homework:** Discussions are taking place about homework in Class IV, although these ideas are not limited to Class IV. The math faculty is testing different things: what changes when one night of homework per week is eliminated? Can they still cover the necessary material? Some teachers are looking to see if assigning homework to be completed by the end of the week allows students to successfully manage it their own way. Others are giving more choice with homework so that students can choose which problems to complete out of a group of problems. Ultimately, being

more explicit about what students are expected to do and “naming” the kind of homework given is an important goal. The science department tries to pace the homework around where that section is. Dialogue is increasing between teachers and students about expectations for homework - time spent, goals, etc. Students are encouraged to communicate with teachers about time spent and challenges they are having with homework so that these can be addressed.

IV. Information, Reports and Announcements - USPA Volunteers