June 2017

Cambridge Science Department Newsletter

The Science Department Newsletter is distributed to Cambridge Public School administrators, teachers and parents as a mechanism for sharing the many great things happening across the district in science.

It's a Wrap…

And just like that the 2016-2017 school year is over. From all of us at the CPS Science Department we hope you have had an amazing school year and are looking forward to all the great things that next year will bring.

Supporting School Based Initiatives

This year the Peabody school has continued its work around Claims, Evidence, and Reasoning with a focus on two of the scientific and engineering practices to support students in making scientific explanations and arguing from evidence. Peabody educators did actual science, wrote their own CER's and worked with doctoral students from BC to deepen their understanding of how to build students' skills. Next year teachers will engage with the text, "What's My Evidence: Engaging K-5 Children in Constructing Explanations."

Thank you to Jen Ford and the Peabody staff for their continued focus and interest in this work.

Saying Goodbye to CRIP

On April 11th we had our last meeting of the district's Curriculum Review and Implementation Planning Team. The CRIP team has been working since September 26, 2013 to develop new curriculum JrK-12. Although the larger CRIP team is no longer, more work will be happening. Kindergarten teachers will begin a two year process of writing and pioneering new units; grade 3 teachers at the King, FMA, and Peabody are pioneering next year; and 2nd, 5th, 8th, and 11th grade teachers are rolling out new units next year. Thank you for an amazing amount of work that has been produced these past four years! It was a bittersweet last meeting. We are so very proud of this work - and DESE was so impressed they are writing about it in their June Newsletter - make sure you check it out!

Barbara Dorritie visits Ecuador

Barbara Dorritie has been collaborating this year with Dr. Lauren O'Connell of Harvard on an NSF-funded project "Physiological adaptations for a deadly diet: Bioaccumulation mechanisms of defensive chemicals in a poison frog."

In the summer of 2016, she worked in the lab of Dr. O'Connell, learning new techniques in DNA extraction, advanced PCR and sequencing. This year, students in her Biology classes were involved in real data analysis: they are tracking the trophic pathways of toxin acquisition in poison dart frogs. The funding also allowed fall semester students to isolate DNA from bugs that

were eaten by Ecuadorian frogs in two separate environmental conditions, amplify the DNA and analyze the sequence information to identify the species of the arthropods.

In April, Barbara, Dr. O'Connell and her team traveled to Ecuador to collect ants and other arthropods in large enough numbers for alkaloid toxin analysis. All samples are being analyzed at Harvard for in order to trace the toxins to their origins. Many of these arthropods are unknown to science! If new arthropods are discovered, students will be given credit in any publication of new species.

The ecological and biotechnological learning that accompanies this project is enormous! Students have learned about the symbiotic relationships that tie ants and plants to fungi and antibiotic-producing bacteria. In addition to answering fundamental questions about the ecological and metabolic pathways that provide toxic protection to plants, fungi, arthropods and the amphibians that eat them, they will also be able to look at the effects of deforestation on the frog's ability to protect itself via toxic diet.

7th Annual 8th Grade Student Science and Engineering Showcase at Harvard University

On Friday, May 26th almost 400 CPS 8th graders participated in the 7th Annual 8th Grade Student Science and Engineering SHowcase at Harvard University. In addition to presenting their own science learning to their peers from across the district, students also participated in demonstrations, tours and talks facilitated by Harvard University graduate students and professors.

[1]

[1] Image courtesy of Harvard University

Sanofi Genzyme Sabbatical - 20 Years of Funding

For 20 years, CPS educators have had the opportunity to participate in a Sabbatical at the Museum of Science funded by Sanofi Genzyme. “This unique professional development opportunity invites a small team of teachers from a single school district to spend a week at the Museum of Science during the academic year… The collegial atmosphere of the program offers ample time for teachers to engage in productive discussion with fellow participants and Museum staff. These discussions offer an arena for exchanging ideas about content and pedagogy in the teaching of science and engineering practices.”[2]

This year, 3rd grade Peabody teachers, Deb Pierce and Maryann Londino worked to think about how to make student thinking visible as they explored content tied to the new units they are pioneering next year. Next time you see them ask about the lessons they learned around forces and motion!

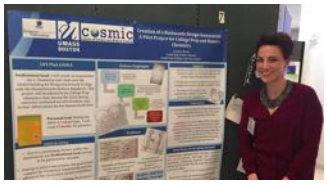
CRLS Observation Night

Thursday, May 4th, the CRLS astronomy club, under the advisement of Tal SebellShavit, hosted an observation night at the Harvard Observatory with two Post Docs, Dr. Or Graur and Dr. Anna Barnacka. While Anna guided the students using the Clark Telescope, the students were in charge of all switches and movement for the telescope and the dome. The Clark Telescope is a 9" refracting telescope that was installed in 1917. The students focused the telescope and looked through with their eyes. After that, they swapped out the lens piece for a camera, adjusted the focus, and tweaked the exposure time to create some high quality photos. In total 13 students (including a few younger siblings) and 10 parents came out.

Three students also found Jupiter! Unfortunately, by that point the clouds had thickened and all that really could be seen was circle. Students could not quite pierce the clouds to see the beautiful bands.

[2] Quote from: https://www.mos.org/collaborations/genzyme

The Final WIPRO Cohort



Four years ago the science department partnered with UMASS Boston and four other districts (Boston, Braintree, Malden and Pembroke) on SEF: Science Education Fellowship for teachers. Teachers participated in two years of professional development, deepened their teaching practice through vertical and horizontal collaborative coaching and learning, completed an independent professional growth plan, and presented professionally produced posters at a conference.

Our final cohort of teachers, **Jessilyn Reese** and **Tal ShabelShavit** presented their posters in May and Lisa Scolaro attended the final conference of the Boston/New York/New Jersey partnership at Mercy College. A big thank you to UMASS Boston, WIPRO, and the amazing fellows that engaged in this meaningful work.

Astronomy in 1st Grade

In the shift to the new standards 1st graders now learn about Sky Patterns to set the foundation for learning about astronomy in 5th and 8th grade. They talked about what objects you can see in the sky at night and which objects you can see both during the day and at night. They focused on observing the patterns of how the sun and moon appear to move in the sky.

The science department supported two additional activities, both of which teachers were able to experience during Professional Development. First, to look at the apparent movement of the sun, students went on a Shadow walk where they traced their shadows in the morning, and then again from the same place at a different time of day. They used what they had learned in the previous light and sound unit about shadows to talk about how the sun moves. They noticed that all their shadows were in the same direction with the sun behind them in the morning, and this was true in the afternoon as well, but the shadows, and therefore the sun, was in a different position in the sky.

Secondly, towards the end of the unit, the science department brought the Sky Lab, a portable planetarium, to most first grade classrooms. Using this model of the sky, students were able to see how the sun and moon appear to move across the sky, and recognize the patterns of them both coming up in the east and setting in the west. Students were very excited to be inside the big dome and enjoyed making predictions about the apparent paths of the the sun and moon based on what they had learned in class!

Opportunities for Integration

As we roll out our new science curriculum, teachers from across the district have been identifying opportunities to integrate the new science topics with other curricular areas. By it's nature, Science provides rich opportunities for integration. It applies many of the practices and skills of other disciplines in an engaging and relevant context. Making authentic connections between content areas can also increase the coherence and rigor for students, and generate novel opportunities for deep critical thinking. In 1st grade at the Morse school, teachers coordinated with their LTS and Art teachers to create an in-depth shadow puppet project during their unit on Light and Sound. Students were able to use skills the developed in ELA to write their scripts, knowledge about how light interacts with different materials from science, and understanding of materials and aesthetics from from art, and technology in the school to create their interdisciplinary puppet shows. At the fourth grade level, teams of teachers from Graham and Parks and

Cambridgeport implemented a year long expedition that made connections between both the science and social studies content, including aligning geology and geography concepts and studying how the available forms of energy in different regions of the United States affected immigration patterns.

Next year as we roll out second grade, we are hoping to facilitate continued integration by aligning the timing of our geology unit in science with the geography unit in social studies so that students have an opportunity to see how tools like maps can be used in both. If you are interested in thinking more about how to use the new curriculum to provide integration opportunities in your classroom please don't hesitate to reach out to our science coaches. We will be happy to think with you about how to fulfil our UbD requirements while creating rich integrated experiences for your students.

Physical and Earth Science Field Study: CPS Science and Engineering Curriculum Links to Local Bioengineered Stormwater Wetland

Seven Cambridge 5th grade classes piloted an outdoor field study this spring utilizing an engineered wetland that addresses polluted stormwater in Cambridge. The Alewife stormwater wetland located on the Alewife Reservation naturally cleans polluted stormwater and slowly releases surface water back to the Little River which joins the Alewife Brook then flows into the Mystic River and eventually to the Boston Harbor. This municipal project is a bioengineered solution to an EPA mandate that the City of Cambridge address untreated stormwater outfalls that flow directly into local rivers.

The movement of water through the engineered wetland serves as a relevant application of the science and engineering concepts 5th grade students learn about in their science classrooms and curriculum unit that was written for newly released MA state science and engineering standards. Based on new standards, students are expected to have a deep understanding of how water moves between earth's systems: the geosphere, hydrosphere, biosphere and atmosphere. Students also learn about the particulate nature of matter in the 5th grade unit. In this case water serves as the context. The Science Department looks forward to bringing a revised Field Experience to all 5th grades next year.

A Final PD Reminder:

For teachers in grades 2, 5 and 8 there are big changes coming next year as you roll out new curriculum. Grade 3 will be pioneered in three schools next year across 7 classrooms. As you plan for you fall, don't forget to mark your calendars for all the amazing professional learning that the science department looks forward to experiencing with you. We are offering all day PD for all teachers as well as after school professional learning. To sign up for any of the 10 hour courses, please use the ERO. You do not need to sign up for the full day PD.

Grade 2:

- Thursday, **August 24th** - 9am-3pm - TRC at CRLS; **November 16th** and **February 1st** - 8:30am-2:30pm - Location TBD
- 10 Hour PD Course: - November 1, January 17, March 21, April 25 and May 30 - 3:30-5:30pm (Course: Grade 2 Science Curriculum Roll Out SCI-0003-TBD SRN: 20170516053000)

Grade 5:

- Monday, **August 28th** - 9am-3pm - TRC at CRLS; **October 26th**, **January 25th** and **March 22nd** - 8:30am-2:30pm - Location TBD
- 10 Hour PD Course - October 4, November 8, December 13, February 28 and May 2 - 3:30-5:30pm (Course: Grade 5 Science Curriculum Roll Out SCI-17-1002-TBD SRN: 20170605008000)

Grade 8:

- Wednesday, **August 22nd**, **October 5th**, **December 14th**, and **February 8th** - 9am-3pm - Location TBD
- 10 Hour PD Course: September 13, November 15, January 31, April 4, and May 9 - 3:30-5:30pm (Course: Grade 8 Science Curriculum Roll Out SCI-1001-TBD SRN: 20170605001000)

Grade 3 Pioneers:

- Wednesday, **August 23rd** - 9am-3pm - TRC at CRLS; **November 30** and **March 1** - 8:30am-2:30pm - Location TBD
- 10 Hour PD Course - October 25, January 10, February 7, April 11, and May 23 -3:30-5:50pm - (Course: Pioneering Science Curriculum PD (Grade 3) SRN: 20170605009030)