

Cambridge Science Department Newsletter

The Science Department Newsletter is distributed to Cambridge Public School administrators, teachers and parents as a mechanism for sharing departmental information on a quarterly basis. There are many great things happening across this district!

What a Busy Fall!

The CPS Science Department has been very busy these first few months of the school year. Much of our focus has been in supporting teachers in the roll out of new standards, curriculum, and the integration of science and engineering practices.

Currently we are facilitating four choice courses for teachers rolling out new curriculum as well as running full day professional development and providing in-school coaching.



This is also the final year of our CRIP (Curriculum Review and Implementation Planning) team. This team has been working together over the past four years to develop a JrK-12 science program. The team has met twice at the Museum of Science to begin the writing of JrK, K and Grade 3.



From Donna Pereira (Science Department Research & Development Analyst):

The fall was off to a swift start as grade 1, 4 and 7 all received new curriculum materials. We have some exciting news for teachers. The science department has worked with Lisa Waters, in ICTS, to develop a new material ordering site that will allow teachers to log in from the department website and request the materials that they need. The site will be set up so that you can enter things into a shopping cart that will be sent to Donna in the science center. She will then fill your request and get them to your classroom. As your grade transitions to the new units, you will be instructed on how to use our new online ordering system.

Here are the Components for Bring Science Alive (4) [Back to listing >>](#)

Components of Bring Science Alive (4)	Category	Quantity	Unit	Delete	Add/Edit
alligator clips, with wires Lesson/Unit #: Energy, Lesson 4 & 5 Energy CEPA	Non-Consumable	24			Quantity/Unit Lesson/Unit #
balloons, 9 Lesson/Unit #: Energy, Lesson 1 NEEDS Waves & Info, Lesson 6	Consumable	30 each			Quantity/Unit Lesson/Unit #
balls, polystyrene, 1 Lesson/Unit #: Waves & Info, Intro Model Lesson	Non-Consumable	3 each			Quantity/Unit Lesson/Unit #

Until that time, you can still request materials by going onto First Class – District Conferences – Science and then into your grade level folder for the material sheets. The other way to request materials is to email Donna Pereira directly. The science center can be found at 159 Thorndike Street, 1st floor.

Please don't hesitate to call or email Donna with any needs or questions - dpereira@cpsd.us
617-349-3012

Designing Solutions in First Grade

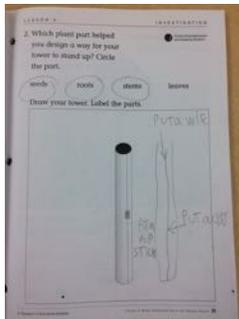
The room is a bustle of activity. Some students are taping feathers to plastic gloves, while others smear their gloves with Crisco. At the table students discuss the merits of using multiple materials versus one material. These first graders are using the science practice of “Designing Solutions” to apply what they have been learning in their “Plant and Animal Parts” unit to solve a



problem. In this case, students have been studying the different parts that animals have, including how different animals have different coverings to protect their bodies. Students looked at pictures of different arctic animals, while listening to audio descriptions from

scientists about how each animal using its body covering to survive in the cold conditions in the arctic. Then they get their problem: to design a glove that will keep their hand warm when it is submerged in a bucket of ice water. This is their second design challenge of the unit.

A couple weeks earlier, when they were learning about the different



parts of plants, they were asked to use what they had learned about parts of plants to design a way to make a paper tower stand on it's own. These young students are learning about an important intersection between science and engineering. They are realizing that information about the world that scientists obtain can be applied by engineers to solve problems. They are introduced to the concept of biomimicry, an approach to engineering which looks at living things for inspiration to solve

human problems. They are learning to make a plan, using guided planning sheets, and to persevere and redesign if their original solution doesn't succeed. These skills will provide a foundation for engineering challenges and performance assessments they will encounter in older grades. They also engage students, foster creativity, and are a little bit messy.

“Plants and Animal Parts” is the first of three new units the first graders will be engaging in as we roll out new science curriculum in the first grade aligned to the new MA standards. Starting in January, students will begin “Light and Sound” which will allow students to explore the essential question “What can we do with light and sound?” During this unit students will continue to apply what they have learned about the practice of “Designing Solutions” to solve problems with light and sound, such as how to design the right window coverings for the purpose of a room. The third, and final, first grade science unit will be “Sky Patterns” and will consider the questions “How can predictions be made based on observations and data?,” and “Why should we recognize patterns that exist in our world?” Through observations, students will recognize that the sun takes the same apparent path from east to west each day, and will apply this information in a design challenge to consider the placement of windows on a building.

Rolling Out 4th Grade

To support teachers in the curriculum roll out, we have done full day PDs this fall for each grade and will again in the spring. Our 4th grade teachers had their full day PD at the end of October. They spent the day learning about the new Energy and Engineering unit. During the day they explored the Curriculum Embedded Performance Assessment for the unit where students will look at a prototype of a windmill and then re-design it to create more electrical energy. Teachers worked with the windmill, analyzed energy transfers, and thought about the instruction needed for students to be successful in this engineering challenge at the end of the unit.



Teachers then experienced a lesson modified from the National Energy Education Development project that they would lead

with students to help launch the energy unit. They practiced identifying energy transfers and transformations in a variety of scenarios. Teachers used solar panels, glow sticks, rubber bands, radiometers, and engaged in discussions to make sense of what was happening. They experienced the kind of thinking that their students would do, and then thought about how to implement this lesson in their own classes. At the end of the day teachers had time to work both in groups with teachers from other schools and their own schools to plan the launch of this unit.

What's Happening at Maynard Ecology Center?



Six classrooms from two different schools are pioneering new second grade science units that will be rolled out

in all second grade classrooms next school year. The new units are aligned with the 2016 Massachusetts Science and Technology/Engineering Curriculum Framework and the NGSS Science and Engineering Practices. At the end of October-November, the pioneering classes visited the CPS Maynard Ecology Center at Fresh Pond as part of their science learning experience about plant and animal survival. Black's Nook Pond provided the perfect spot to investigate first hand the needs of pond plants and animals that the students learned about in class. While at the Maynard Ecology Center students also learned that many seeds have "sticky" parts that help seeds stick to animal fur. Did you know, seeds like these were the inspiration for the engineering of velcro?

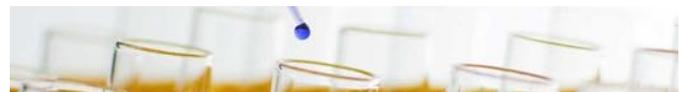
This fall 390 Cambridge fourth graders observed evidence of weathering and erosion at Fresh Pond while practicing gathering evidence as data to enhance their



classroom learning about earth's changing surface. Students also designed their own investigations using stream table models while testing variables such as slope, earth material, amount of water poured and amount of time for pouring which supports one of the 8 Science and Engineering Practices: *Planning and Carrying out Investigations*. Not only did students learn about what erosion looks like at Fresh Pond but they also saw different forms of erosion control that the Cambridge Water Department has put into place to help mitigate erosion locally.

Change Is a Coming: CRLS Explores New Elective Offerings

As part of the larger science curriculum review cycle, CRLS science teachers have been engaged in a discussion about our elective pathway and what courses we should continue to offer, which should be retired and what new offerings to add. After reviewing the career paths that CRLS graduates have taken, enrollment figures for our district, as well as the elective offerings of 25 comparable districts, science teachers proposed four additional courses to consider adding to our elective offerings: *Brain and Behavior*; *CP Environmental Science*; *Food, Farming, and Our Planet*; and *Project Physics: The Way Things Work*. Juniors and Seniors were surveyed to gauge interest and we are excited that enough students expressed being "very interested" in all four offerings - enough to offer at least one section of each.



Engaging in Argument from Evidence in Seventh Grade

This year seventh grade teachers are also rolling out new curriculum units aligned to the newly adopted MA science standards. These new units are inquiry based, investigations based on units from a program called IQWST (Investigating and Questioning our World through Science and Technology). Seventh grade students were introduced to the IQWST units and format last year during the sixth grade roll out, so they are familiar with some of the structures of the units. Each unit starts with an essential question that engages students and gets them thinking about what they want to learn. Students then experience a phenomena related to the essential question, and create a Driving Question Board (DQB) with their own questions they have on the topic of the unit -- either inspired by the phenomena they witnessed or their own experiences and curiosity. The unit then progresses through a series of learning sets that provide students with investigative experience and engaging grade level texts all of which provide different evidence to help students answer questions from the driving question board, and ultimately reach some understandings of their essential question.

In sixth grade, student focused heavily on the practice of using the evidence they gathered from investigations to develop accurate models to represent scientific concepts. The new seventh grade units focus on a different practice, the one of "Engaging in Arguments for Evidence." Middle school students who are accomplished in this practice are able to "construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation for a phenomena or a solution to a problem," and "respectfully provide and receive critiques on scientific arguments by citing relevant evidence and posing and responding to questions that elicit pertinent elaboration and detail." IQWST supports students in developing these skills by encouraging teachers to regularly lead class discussions that help students synthesize information and press them for understanding, and

by requiring students to supply written arguments based on evidence.

In addition to the chemistry unit, 7th graders will have opportunities to engage in arguing from evidence in a physical science unit about energy, a life science unit about the human body, and an earth science unit about weather. They will gather evidence and ask question about essential questions such as "Why do some things stop while others keep going?," "What is going on inside of me?," and "What makes the weather change?"

Upcoming CRLS RAPs Event

The first CRLS RAPs (Research Academic Presentations) event will be hosted in the CRLS Auditorium on Dec 20th. Paul McGuinness has been



working to organize this event where scientists and other experts will be speaking to students during periods 2 and 4 of the school day.

Look for our February Newsletter for more details on this event and other great things happening in Science across the district.

District Science Team

We want to extend a warm welcome to Kate Callaghan, our new district science instructional coach! Welcome Kate!

Lisa Scolaro JrK-12 Science Curriculum Coordinator
Allan Gehant Dean of Science Curriculum, CRLS

Susan Agger Maynard Ecology Center Teacher
Kate Callaghan JrK-8 Science District Instructional Coach
Donna Pereira Material's Maven :)
Emily Speck JrK-8 Science District Instructional Coach

