

SciMo Says

**The Newsletter for Science in Motion at Susquehanna University
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Director's Column

Cherokee Pharmaceuticals, LLC has awarded SIM a \$10,000 equipment grant! The grant has been used to purchase eight new Dell laptop computers. These computers will be used to replace antiquated technology and expand SIM offerings.

The Chesapeake Bay Commission has generously pledged \$25,000 to support the fourth year of the SIM-SRBC Water Quality Project! The project engages secondary science students in the collection of real and meaningful water quality data in the Chesapeake Bay watershed. Teachers **Karen Avery, Mary Dahlmann, Sheila Furr, Joshua Greene, Greg Laubach, Sarah Puderbach, John Slotterback** and **Kristen Vitkauskas** were accepted to participate in the 2008-09 Water Quality Project and attended a training workshop at Susquehanna University on June 23 and 24, 2008.

The **SIM Summer Workshop** was held at Susquehanna University Monday, June 16 through Friday, June 20, 2008. Dr. Johnson, Assistant Professor of Chemistry at SU, lead several sessions introducing the new Vernier SpectroVis. Wednesday, June 18th was Knoebels day and Thursday, June 19th was Crime Scene Day with the introduction of a new wildlife poaching crime scene.



Greg Laubach of Central Columbia uses the new Vernier SpectroVis introduced at the Summer Workshop (left) and at the Water Quality Workshop teachers determine water quality of Penns Creek

On Saturday, September 6, 2008 SU-SIM will have a display at the Susquehanna Valley Mall. We will have biology, chemistry and physics experiments set up showing visitors various SIM labs. We invite you to

stop by our display from 10 am to 3 pm in the Bon Ton center court area of the mall. This event is instead of the SIM Mole Day Dinner.

This fall, Madge Schworer will be student teaching. Thus, Mike McDevitt and Greg Stout will take over requests from biology teachers for SIM visits and equipment drops in the fall 2008. In the **spring 2009, Greg Stout will be student teaching.** Thus, Mike McDevitt will take over Water Quality visits as well as biology visits and drops normally performed by Greg.

Due to the hectic schedules of Mobile Educators and teachers busy schedules, we encourage teachers to direct **student helpers to assist unloading the van and carry in supplies during a drop/visit as well as help carry out and load up the van after a visit/drop.** Teachers who already assign student helpers have reduced drop off and pick up time from an hour to just a few minutes. This not only helps the SIM MEs make more visits and drops, but also leads to less disruption of your class.

I would like to invite teachers to **begin signing up for SIM visits/drops now through December 2008.** I will make a separate announcement in November when we open reservations for spring SIM visits/drops. Please fill out reservation forms for the fall semester now, but hold off sending spring reservations until I announce we are accepting them.

Mike McDevitt, Biology Mobile Educator Says...

On the road again.... After recently retiring from teaching after 34 years I was contemplating fishing and/or



Mike McDevitt, SIM Mobile Educator and South Williamsport High School teacher, Matt Eisley, make liquid nitrogen ice cream at the summer workshop.

hiking everyday for the next thousand or so days when an opportunity at SIM/ SU arose. Both Madge and Greg, our biology mobile educators will be student teaching during the same school year, Madge in the fall of 2008 and Greg in the spring of 2009. Dr. Thomas invited me to join SIM/SU as a full time substitute mobile educator for the 2008-09 school year. I would be performing Madge's duties during the fall and Greg's duties during the spring.

As my teaching certification is in chemistry I am sure I will have some challenging moments adapting to the temporary Biology ME duties. With some patience from our cooperating biology teachers and some reeducation on my part I am sure the transition will be successful.

A few new ideas I have been developing over the summer involve additional crime scene components. A soil testing CSI component would (1) compare and classify the appearance of

several soil samples, (2) test the conductivity, pH, and water absorptivity of soil samples. Techniques would include using conductivity and pH probes from Vernier and simple gravity filtration that would indicate the water retention properties of the soil. Eventually the test results should provide convincing data to lead to apprehension of the perpetrator.

Another addition would involve the use of our new Vernier SpectroVis spectrophotometers. These devices remarkably provide a full visible spectrum absorbance scan of a sample within a 60 second scanning period. You must check out these spectrophotometers. The new CSI protocol involves determining which food dyes are found in liquid samples found at the crime scene and comparing these with evidence samples. There are only nine food dyes approved by the FDA and all artificial colors are achieved by mixing of some or all of these dyes. By performing a visible spectrum absorbance scan of each dye of known concentration, a comparison of dyes present and relative concentration ratios can be determined then compared with evidence samples.

Jaclyn Todd, Chemistry/Physics Mobile Educator Says...

Welcome back everyone. I hope you had an enjoyable summer vacation. At SIM, we had a lot going on this summer. We had another successful summer workshop which highlighted many of our new labs and our new equipment. We also received some much needed new floor tiling from facilities and we painted our offices.

We also worked on some new labs that we will be offering this fall. In the physics department, we added the lab *Tension and the Isosceles Triangle*. In this lab, students will collect force data for a hanging mass on a string using force sensors to analyze the concept of tension and to study vector forces in a static situation.



Teachers Carol Hoagland and James Robbins test out our new physics lab "Tension and the Isosceles Triangle" at the SIM Summer Workshop.

In the lab *Emission Spectra*, students will use our newly purchased Vernier Spectrometers (SpectroVis) to measure the emission spectrum of discharge tubes containing helium, hydrogen, krypton and neon. We have also added some new chemistry labs at SIM. In the lab *Gold Nanoparticle Synthesis and Analysis*, students will explore the size-dependent properties of gold nanoparticles and investigate the effects of adding different substances. In the lab *The Kinetics of a Bleach*

Reaction, the students determine the rate law and order of a reaction between food coloring and commercial bleach based on the analysis of the graph of absorbance vs. time using a Vernier Spectrometer to measure the absorbance of the reaction over time. In the lab *Determining the Concentration of a Solution: Beer's Law*, the students determine the concentration of an unknown copper (II) sulfate solution by measuring its absorbance with a Vernier Spectrometer and using the slope of the Beer's law curve. The SIM staff will also be heading back to Juniata College again this year. Our annual Sharing Workshop is the first week in September. While there, we will hopefully get our hands on some of the new labs being developed at other SIM sites so we can offer those to you. Be sure to contact me and send in those reservation forms as soon as possible to get the equipment you want reserved. I look forward to working with you all again this school year. Good luck!

Greg Stout, Mobile Educator Says...

Wow, where **did** the summer go? June was very busy with preparations for and execution of the SIM summer workshop (June 16th – 20th) and our Water Quality workshop (June 23 and 24th). As always, it was good meeting new teachers as well as networking with many of the veterans. We trust that those attending learned some new skills and picked up some ideas for new labs to use in their classroom.

In July, we began preparing to move our entire office area to another area in preparation for the installation of new tile. This provided a good opportunity for a thorough cleaning and fresh coat of paint for our “home away from home”. In late July and August, the more difficult task of moving back in took place. We also took this opportunity to inventory, sort, discard obsolete/expired items and reorganize our storage and prep areas as they were bursting at the seams. We also began preparing for the new school year by checking equipment, updating laptops, ordering supplies, and prioritizing/scheduling new reservations.



At left teachers at Knoebels Day learn methods for determining water quality index and teachers attending the Water Quality workshop perform conductivity measurement on water from Penns Creek.

In August, I met with two teachers new to our Chesapeake Bay Water Quality program to select streams we will monitor this school year. **Kristen Vitkauskas** (Southern Columbia Area School District) and her students will be working with me this year at Roaring Creek in Columbia County. Roaring Creek is a tributary of the North Branch Susquehanna River between the communities of Bloomsburg and Danville. **Sarah Puderbach** (Loyalsock Township School District) and her students will join me at Miller’s Run (Lycoming County). Our chosen stream site is located just north of the High School on Northway Road and empties into the Susquehanna midway between Montoursville and South Williamsport.

I am looking forward to working with these two teachers this coming year as well as the six veteran teachers who are returning to be a part of our Water quality program. I also hope to see many more of you on regular visits or drops of Science in Motion Biology equipments and labs. Check out our website for labs offered, available dates and keep sending in those reservation forms. I hope to see you soon!

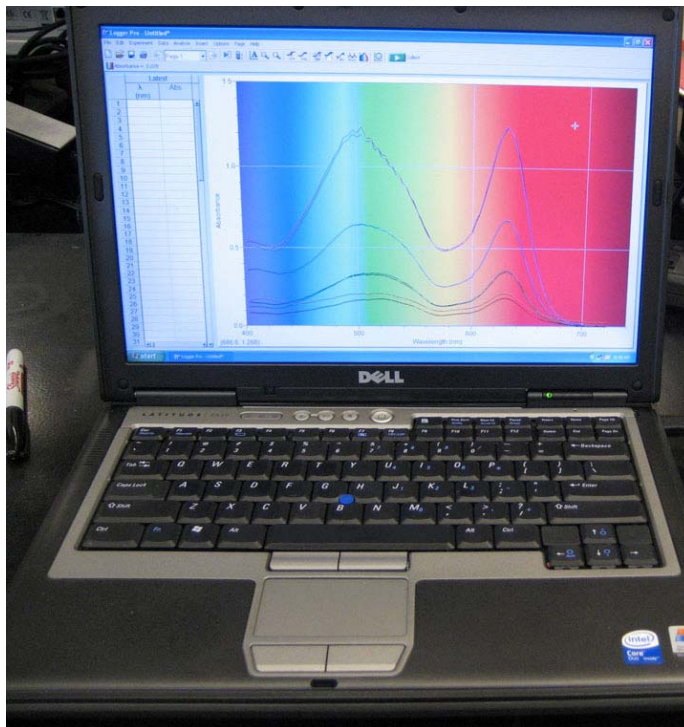
Experiment of the Month

Vernier Spectrometer Lab #5: Determination of Chlorophyll in Olive Oil

We showcased Vernier's new SpectroVis at our June 2008 SIM Summer Workshop and demonstrated experiments for biology, chemistry and physics teachers. This experiment of the month investigates the determination of chlorophyll in three grades of olive oil.

The chemistry of chlorophyll (some references site four types: a, b, c, and d) creates three yellow absorbance peaks at 413, 454, and 482 nm, and two blue absorbance peaks at 631 and 669 nm. The combination of these wavelengths is green to the human eye, but different sources of chlorophylls will have different ratios of these peaks, which create various shades of green. Thus, in the world of chlorophyll, all greens are not the same.¹

The first part of the experiment involves analyzing a sample of the three grades of olive oil to determine the absorbance peaks that are present. A Vernier SpectroVis is used to measure the absorbance of the olive oil samples over the visible-near infrared (NIR) light spectrum (400 – 725 nm). An unknown sample of olive oil is then analyzed to grade it as extra virgin, regular, or light.



Spectra of various grades of olive oil

Save a Tree

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¹ Reference from Vernier's website; see <http://www.vernier.com/spectroscopy/svis.html>