

# SciMo Says

**The Newsletter for Science in Motion at Susquehanna University  
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## **Dr. Courtney Thomas, Director Says...**

Pennsylvania State Representative Merle Phillips (R-108) experienced Science in Motion first hand in Mary Dahlmann's classroom at Shikellamy High School on April 2, 2009. Mrs. Dahlmann's ninth grade biology students worked to solve the biology crime scene by performing DNA Fingerprinting. Representative Phillips interacted with students while they loaded crime scene and suspect DNA samples on an agarose gel and electrophoresed the samples to separate the DNA fragments. After an overnight stain, the DNA samples can be compared to determine who committed the crime. News Radio 1070 WKOK and The Daily Item covered the event.



*Representative Merle Phillips and Dr. Courtney Thomas, SIM, look on as a Shikellamy High School student works to solve a crime scene.*

displays in the East Rotunda of the Capitol Building and a press conference was broadcast on PCN. **State Representatives Merle Phillips, Russell Fairchild, David Millard and Adam Harris** visited the SU-SIM display. SU-SIM displayed Crime Scene PCR, Emission Spectroscopy and Tones, Vowels and Telephones.

There are still openings for teachers to register for the **SIM STEM Summer Workshop on Monday, June 15 through Friday June 19, 2009**. Please complete and send the attached reservation form to SIM if you are interested in attending. We are **looking for teachers willing to give one hour long lectures or demos** on how to incorporate STEM into your classes. Presenters will receive \$100. Anyone who has recently attended a workshop on STEM education would definitely have information to share. Please e-mail me if you are interested in presenting (thomasc@susqu.edu).

**SIM Capitol Day** was held on **Tuesday, April 21, 2009**. All twelve SIM sites had



*SIM Mobile Educators Madge Schworer and Jaclyn Todd at Capitol Day.*

Continue to send SIM your signed petitions as well as e-mail/write your legislators and Governor Rendell. Make your voice heard in support of SIM funding!

## Madge Schworer, Biology Mobile Educator Says...

Spring is finally here . . . maybe even summer as the temperatures go up! April began and ended with *Crime Scene Investigation*. Mary Dahlmann at Shikellamy High School used the crime scene lab with



*Shikellamy students work together to load DNA Fingerprinting gel.*

her Biology students as the month began. We looked at traditional fingerprinting, hair analysis, fabric analysis, blood typing, and DNA fingerprinting to solve the murder of biologist Edward Coli. We were happy to share one class period with Representative Merle Phillips. Students shared their crime scene experiences, demonstrated setting up DNA electrophoresis, and discussed other Science in Motion memories with him. Thanks to all students for their help that busy day! Ending the month was a *Crime Scene Investigation* at Danville High School with teachers Donna Counterman and Donna Wood. We used

the same modules of the biology crime scene and added footwear analysis in our now annual crime scene. Students participate in the crime scene as part of their final exam experience in Biology. In addition, Donna Wood's Forensics students completed *Crime Scene PCR* as part of their study of the forensic aspects of DNA analysis. Also in April I visited with the Honors Biology classes at Lewisburg High School taught by Jeremy Lauver and Brandi Spotts. We extracted fish muscle and did polyacrylamide gel electrophoresis in *What's Fishy about Evolution?* Students were amazed by the number of protein bands they were able to see as they made comparisons between fish species. Back to back *Primary Productivity* labs were next at Milton High School.

Karen Avery shared this lab with the AP Biology students who calibrated DO probes and carefully analyzed and calculated primary productivity using a culture of the algae *Chlorella*. Kathy Bower and Jocelyn Bailey used this lab with their biology students focusing on tracking photosynthesis by following changes in DO levels. This



*Danville students analyze fingerprints in their Crime Scene Investigation.*

group followed the next day with *Effect of Temperature on Poikiotherms (Cricket Respiration)*. Also in April equipment loans were made by Michelle Nardella at Williamsport High School – *Bacterial Sensitivity (antibiotics)*, Kathy Bower at Milton High School – spirometers for *Lung Function*, and Paulette Armbruster at Selinsgrove High School for *Genes in a Bottle*. Mobile Educators spent a day in Harrisburg for our annual Capital Day demonstration, meeting with legislators, talking with capital visitors,

and networking with Science in Motion consortium members from across the state. Remember to check your calendars for the SIM Summer Workshop and send in those sign ups.

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

The end of the school year is quickly approaching. I am glad to have been able to visit many of your classrooms so far and I look forward to seeing those of you who still have scheduled visits with me coming



*Selinsgrove High School students produce acid rain in the lab and then test the pH level of that acid rain.*

up. I began the month with a short trip to visit **Brianna Miller** at **Middletown High School**. Her students performed the lab *Gold Nanoparticle Synthesis and Analysis* where they investigate the size-dependent properties of gold nanoparticles and the effects associated with adding different substances such as salt and sugar. Then I headed over to **Shikellamy High School** to visit the students of **Jodi Schmidt**. Her students performed the lab *Pressures Underfoot*. The students were able to calculate their foot pressure while standing and while walking. They calculated their individual foot area using our forensic ink and forensic developing paper. They were also able to watch a virtual step as they walked across our hi-tech Novel Foot

Pressure Platform. Students always seem to enjoy this lab! SIM's own **Greg Stout**, student teaching under **Selinsgrove High School's Clint Miller**, brought SIM into his chemistry and biology classes for the lab *Acid Rain*. His students generated three gaseous oxides and then simulated the formation of acid rain by bubbling those gases into water. Then they used our Vernier pH probes to measure the pH of the three resulting acidic solutions and compared their strengths.

At **Shikellamy High School**, the physics students of **Colleen Ruths** performed the lab *Ohm's Law*. Her students used the Vernier circuit boards, differential voltage probes and current probes to determine the relationship between current, voltage and resistance in a circuit. The students also performed the lab *Series and Parallel Circuits*. They studied current and voltages in series and parallel circuits using the Vernier circuit board. In addition, the students used the circuit board to perform the lab *Capacitors* where they measure an experimental time constant of a resistor-capacitor circuit and compare it to the value predicted from the component values of the resistors and capacitance.



*South Williamsport High School chemistry students try to determine the identity of unknown organic liquids.*

They can also measure the potential across a capacitor as it discharges and charges. The physics students of **Jocelyn Bailey** at **Milton High School** performed the lab *Momentum, Energy and Collisions*. In this lab, the students measure the energy changes that occur as two collision carts crash. Then they classify these collisions as elastic, inelastic or completely inelastic. Then I was off to visit the chemistry students of **Matt Easley** at **South Williamsport High School**. His students used our Fourier Transform Infrared spectrophotometers (FTIR's) to examine organic compounds using infrared spectroscopy in the lab *Identifying Organic Compounds using Infrared Spectroscopy*. The students determined the identity of unknown samples by comparing the wave-numbers of their peaks in the spectrum produced to a table of known values.

At this year's Capitol Day, I brought the labs *Emission Spectra* and *Tones, Vowels, and Telephones* to display as the SIM consortium met to promote further funding of our program. I also brought along all the petitions I was able to acquire from my visits with teachers. Thanks to all of those teachers who signed and gathered signatures for the petitions. They really made an impact with the legislators! **Joshua Greene** of **Bloomsburg Christian High School** performed an array of labs this month with his physics students. They performed Newton's Third Law, Ohm's Law, Series and Parallel Circuits, Capacitors, Momentum, Energy, and Collisions, Energy of a Tossed Ball, Work and Energy, and Impulse and Momentum. **Ed Kelley** utilized our *liquid nitrogen* supply and materials at **Williamsport High School** to investigate cryogenics with his chemistry students. This lab demonstrates the behavior of materials such as racquet balls, bananas, balloons and metals at very low temperatures.

Please let me know if I can be of any assistance to you and your students as the end of the year approaches.

### **Mike McDevitt, Mobile Educator Says...**

The Water Quality van made several visits to area streams in the last month. The van traveled to Snyderstown and **Shamokin Creek**. **Shikellamy** students from **Sheila Furr's** classes measured and tested the AMD impacted stream. Incredibly we witnessed several groups of geese and a blue heron that inhabit the area. A blue heron meant there must be something living in the stream. Later in the week, I dropped the equipment for our *Enzyme Activity* experiment for Mrs. Furr and her students. The van then traveled to Gordon, PA and tested **Little Mahanoy Creek** with **John Slotterback** and his **North Schuylkill** Students. A few days later it was back to **North Schuylkill** to perform *EKG and Heart Rate* experiments with **Mrs. Begis** and her physiology students. It is difficult to believe there is only one more month of WQ and classroom visits. Once again thank you to all of the Science in Motion participating teachers.

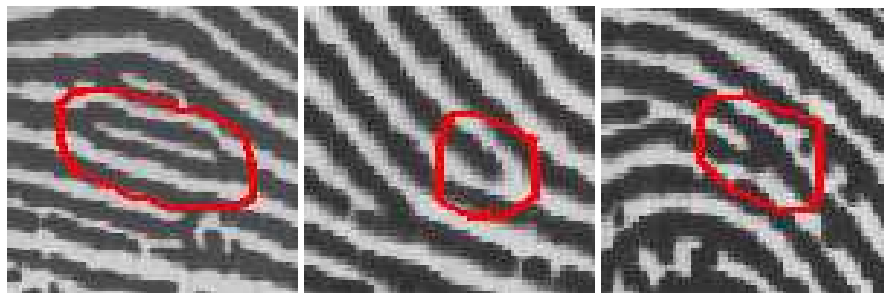
After several years where I was not involved with **Science in Motion's Capitol Day** I was once again invited to participate. It is truly amazing to see the number and diversity of people that enter the capitol building in one day. While stationed at the SIM/SU table in the Capitol we witnessed a parade of politically motivated groups including the Fraternal Order of Police, Second Amendment Rights Advocates (NRA), Bayada Nurses, and the Pennsylvania Jewish Council. In addition, there were at least 10 bus loads of Parochial School students, chaperones, and teachers arriving and exiting throughout the day; a truly diverse collection of Pennsylvania citizens. I may not agree with our legislators very often but they truly earn their salary. Their time and attention are never their own. Meeting with constituents, special interest groups and normal legislative duties require an inordinate amount of time. In addition, they are required to put up with Harrisburg traffic. I am truly a rural driver. Parking the van in a downtown parking garage proved interesting. Nothing over 6 feet 7 inches was allowed. How high is a SCI MO van? Well, it was allowed into the garage. They do have limited spaces 8 feet high but only five feet wide. I do not squeeze between

van doors and other vehicles as well as I did twenty years ago. Unaware, I actually squeezed my wallet from my coat pocket. Half way to the Capitol from the garage I discovered its absence only to return to the van to find it sitting on the garage floor safe, sound, and containing everything it should. Hopefully, we will be able to attend many, many more Science in Motion Capitol Days.

## Experiment of the Month

### *Fingerprint Analysis*

The Biology Crime Scene contains several components that can help your students develop the observation skills and attention to detail that we all hope for in the young scientist. One of these activities is the *Analysis of Fingerprint Evidence*. Students are quite interested in the CSI shows on the television and always seem particularly interested in examining something they own – their fingerprints. The introduction of the topic of fingerprints brings an immediate reaction to begin study of one's own fingers and comparing them to each other and to the fingerprints of classmates. Looking at inked fingerprints, individually or as a set is a good beginning. Providing reference sheets and hints to search for the individual components of a fingerprint and giving those structures a name provides an observation puzzle for each student. No matter the grade level, they are interested in what makes them different from each other. In the crime scene students look at one or more of their own prints and seek out eyes, and ending ridges, and forks or bifurcations using magnifying glasses and record their findings. Lifting fingerprints from various surfaces can also be done using magnetic powder and a magnetic wand creating an instant paintbrush of magnetic material that will be picked up by the oils left behind by a finger on a smooth surface. Students visualize their prints on the surface of plastic or glass or metal by dusting and lifting the print with clear tape. There is a friendly competition as students try to do the best job with this process. With encouragement they return to the data recording sheet and elaborate on their initial classification of print with the details that makes each one individual. In the forensics lab, fingerprints from a pool of suspects are compared to a collection of crime scene evidence and identifications are made. While the crime scene lab is lots of fun, it requires a several day commitment to complete. Remember that you can use each of the crime scene components as a stand-alone activity to study anatomy or to simply work to develop the observation and recording skills of your students.



Can you name these structures?

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