

SciMo Says

**The Newsletter for Science in Motion at Susquehanna University
Volume VIII Issue 6 February 2009**

Director's Column

We recently sent out letters to teachers asking you to write your legislators to support continued SIM funding. SIM barely survived two rounds of budget cuts this fiscal year and the 2009-2010 state budget will be even tighter. Of course one easy way for legislators to save \$2.5 million is to eliminate SIM funding from the state budget. Don't let this happen! The SIM program is a fraction of the cost of other education programs, is extremely cost effective, and provides relief from mandates. If you have not already taken the time to **write your legislators**, please do so now! Please **send a copy to SIM**. I will take these letters with me when I visit legislators in February asking for their support to continue funding the SIM program.

It is official! **SU-SIM is a member of the Pennsylvania STEM Initiative!** The STEM (science, technology, engineering and mathematics) Initiative develops and deploys statewide strategies designed to enhance the Commonwealth's education and workforce development efforts targeted at the development of a globally competitive STEM workforce. SU-SIM is a member of the Central Region division of STEM.

SIM is still accepting reservations for spring semester visits and drops. Please submit your reservation forms on-line for visits/drops through June 2009. To go directly to the SIM reservation form, just click on <http://www.susqu.edu/sim/reservation.htm>. To find out dates the ME's still have available, click on <http://www.susqu.edu/sim/Available%20Dates%20for%20ME%27s.htm>.

Madge Schworer, Biology Mobile Educator Says...



Central Columbia students load a vertical polyacrylamide gel to analyze PCR products in the GMO Investigator lab.

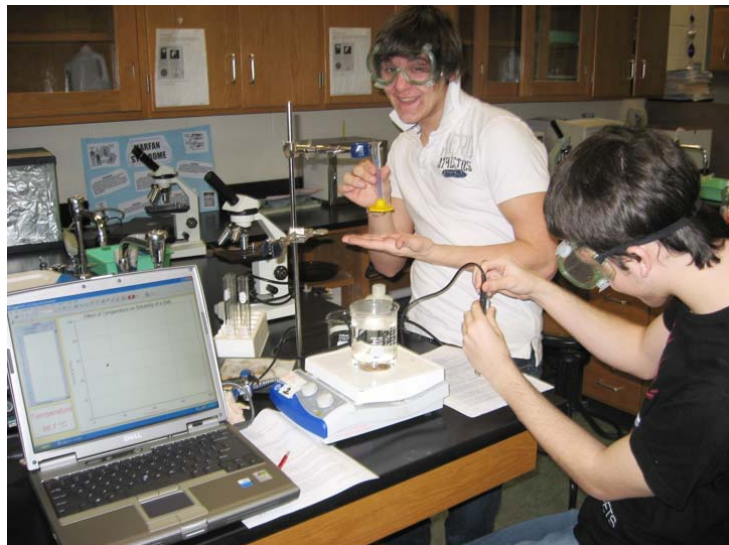
I have had a busy return to Science in Motion. Despite snow and ice in my first solo week back, **Donna Wood's** Forensics students at **Danville High School** completed the *Crime Scene PCR* lab. Students ran the reactions using the SIM thermal cyclers and analyzed products using agarose gel electrophoresis to determine the genotype of the prime suspect. At **Juniata High School**, **Dan Smith's** advanced biology students performed the *Human Chromosome Spread* lab. I then visited **Central Columbia High School** with the 4-day long *Genetically Modified Organism PCR* lab. **Lee Ercolani's** Genetics students extracted DNA from certified non-GMO plant material and then from a test food. PCR reactions were run and products analyzed using polyacrylamide gel electrophoresis.

Kudos to these students who showed careful technique and consequently had very good results. See one of their gels in the Experiment of the Month section. Finally this month **Allison Spencer** at **Berwick High School** invited me to her Biology 1 classes for *Limitations on Cell Size*. In addition, **Mary Dahlmann** at **Shikellamy High School** borrowed the Leica Microscopes for her study of mitosis, **Pam Ulicny** at **Tri-Valley Junior/Senior High School** borrowed the digital microscopes to do the lab *Plasmolysis of Elodea*, and **Bo Meyer** at **Williamsport High School** borrowed electrophoresis equipment for all his classes: *Fish Protein* polyacrylamide gels for his advanced biology students and *DNA Fingerprinting* using agarose gels for his ninth graders. I have also been able to provide some help in the form of equipment loans for **Lewisburg High School** Biology students working on independent projects under the guidance of **Jeremy Lauver** and **Brandi Spotts**. I am working on the spring schedule to try to fit in the large number of requests that I have received. Old Man Winter has already caused some changes but I hope to post available dates soon. Thanks for the warm welcome back that I have received from all of you!

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

I hope that everyone is having a great New Year so far this school year. We have been busy at SIM taking all of your spring reservation forms. Feel free to send me an e-mail about any of the labs that your class would be interested in doing. You can find all of those labs at our website <http://www.susqu.edu/sim/>.

I started off the New Year with a visit to **Brianna Miller** at **Middletown High School**. We were very happy to have Brianna join the list of our SIM served teachers. Her chemistry students performed the lab *Determining the Concentration of a Solution: Beers Law*. The students use a Vernier colorimeter to measure the absorbance values of standard solutions they have prepared and then use their results to determine the concentration of an unknown solution. Her students also performed the lab *The Kinetics of Bleach Reaction* this month. In this lab, students determine the rate law and order of a reaction between food coloring and commercial bleach using a Vernier Spectrometer or Spectro-Vis. **Brandon White's Danville High School** physics students performed the lab *Momentum, Energy and Collisions*. In this lab, students measure the energy changes that occur as carts collide. They classify the collisions as elastic, inelastic or completely inelastic. While the equipment was at Danville, physics teacher **Jack Deal** also allowed his students to perform the lab. Then I was off to visit the chemistry students of **Jocelyn Bailey** at **Milton High School**. Her students did an investigation to study



Jocelyn Bailey's Milton students study the effect of temperature on solubility.

the effect of changing temperature on the amount of solute that will dissolve in 100g of water in the lab *Effect of Temperature on Solubility of a Salt*. The students dissolve different quantities of potassium nitrate in water and then use a Vernier temperature probe to monitor the temperature change as the solutions cool. **Greenwood High School's Brian Tomko** brought SIM into his classes this month for the *liquid nitrogen demonstration* for an investigation into cryogenics.

Please continue to send in your reservation forms for the spring semester.

Mike McDevitt, Mobile Educator Says...

Well, it has been a very difficult early January. Inclement weather, severe low temperatures, and an uncooperative mother nature have led to school delays and cancellations. It has wreaked havoc with my schedule. Such as it is, I have decided to highlight Science in Motion's equipment loan program. Over the course of the last several months, Science in Motion has been involved with many equipment loans which we strongly encourage. We certainly do not want to see equipment sitting in the office; it should be on the road traveling to schools in our service area. We should be able to make even more loans in the future, especially involving Vernier probeware due to the availability of the new LabQuests. The LabQuests can be used in the classroom but really find their best niche when the laboratory moves outdoors. Hopefully, everyone can utilize the LabQuests – certainly if you are involved with outdoor education programs. Science in Motion equipment loans are very popular and by definition do tie up pieces of apparatus for two weeks. However, I am discovering that teachers are utilizing and finishing up with the equipment before the loan period has expired. Due to high demands and budgetary constraints, please inform Science in Motion when you are finished with the equipment. A simple e-mail will be sufficient. This allows the SIM staff to coordinate pickups with visits to the same school or nearby schools. It conserves both time and money if one van trip can complete multiple tasks to schools in a similar region. For example, equipment like our Leica microscopes and our digital scopes are in high demand and we work very hard to coordinate visits with loans which utilize these microscopes. They are almost never sitting in the office. In most cases when they are picked up at one school they are dropped at a new school the same day or used in a visit the following day. The scopes are the most severe example of scheduling demand. There are many other examples of high demand. If you are finished using the equipment, we are asking you to simply e-mail us so we can collect the equipment. This allows maximum utilization and saves space in your room.

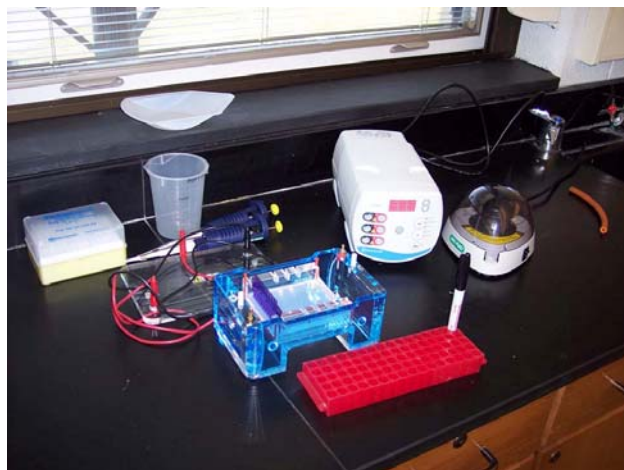
I have one last comment about our loan program. **Please notify us immediately if a piece of apparatus or technology is not working properly.** We would like to replace it the next day or as soon as possible. Also, very often as we are retrieving the equipment someone might say, "Oh, one of the computers did not work." Very likely we could have replaced it the very next day. We want to provide you with the best equipment we have. At the very least please mark the computer in some way so we can have it checked by our IT department. Please help us to help you. All of the ME's want to provide the best service we can. February has got to be a better month. I am sure I will be complaining about the heat in the next newsletter.

Experiment of the Month

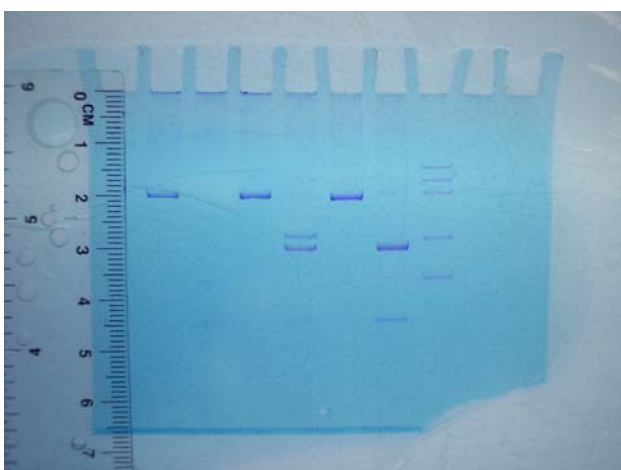
Electrophoresis

Electrophoresis of DNA or proteins is a great way to incorporate techniques used in biotechnology into your classroom. The analysis of DNA fragments or of proteins contained in a substance by this technique will give students exposure to sophisticated methods of analysis that they will encounter if they choose a science related field of study. All students encounter DNA evidence in the news as they read about crime and watch the ever popular forensics related television shows. Actually doing the analysis of DNA or proteins gives them an appreciation of the reality of evidence analysis – procedures take longer than you see on TV and results are not always clear cut. With Science in Motion equipment, your students can all participate in setting up and running electrophoresis analysis. This technique can be incorporated into your curriculum in many places and at many levels. You may choose to investigate proteins through

electrophoresis with our vertical PAGE gel set ups as you study macromolecules and or you may choose to tie this with a study of evolution and the similarities found between closely related species (**Something Fishy about Evolution**). You may choose to make an inquiry based activity in which students make their



Equipment set up for agarose gel electrophoresis.



Example of GMO polyacrylamide gel.

They will learn about extraction of proteins, denaturing of those proteins, separation techniques and reasons behind these steps in analysis. In analyzing DNA, students can use agarose gel electrophoresis to separate restriction fragment digests of DNA as a stand alone activity, with more precise size analysis using a molecular weight standard curve, or with a forensic twist in a stand alone DNA lab or as a part of a crime scene. Electrophoresis is the analysis component for all our PCR labs. Using precision micropipettors, microcentrifuges, gel boxes, and power supplies as tools of the trade introduces students to the world of scientific analysis. Many students discover that they enjoy precision work as they proceed through this activity and others provided by SIM and investigate how they could incorporate this into a career path. This equipment is available through visits with a number of labs and equipment loan. Check out the website for specific lab offerings that may fit your needs.

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