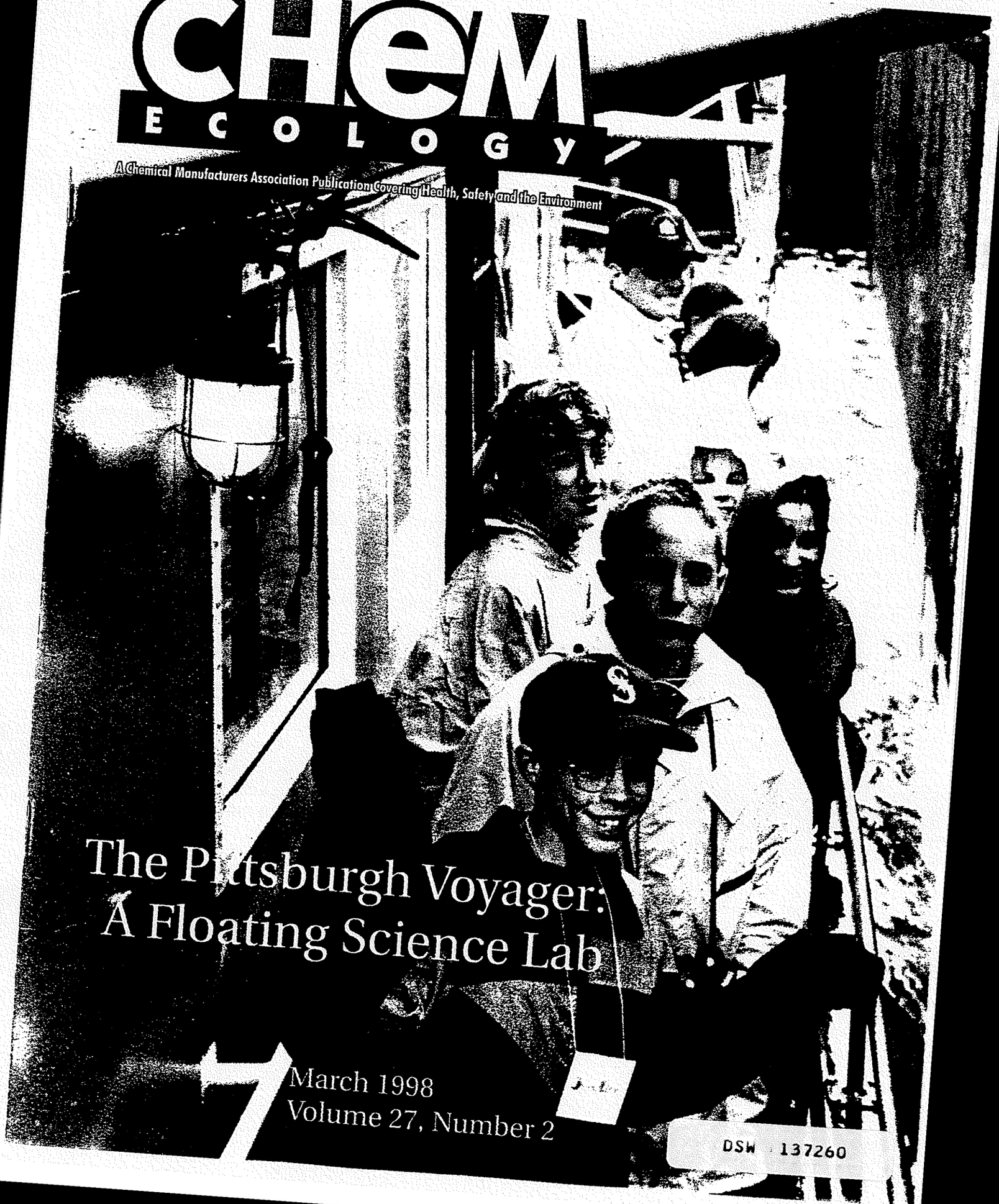
CHEM ECOLOGY

A Chemical Manufacturers Association Publication Covering Health, Safety and the Environment



The Pittsburgh Voyager: A Floating Science Lab

March 1998
Volume 27, Number 2

DSW 137260

STLCOPCB4037215

The Pittsburgh Voyager:

By Michael Richman

In downtown Pittsburgh, there is a point where the Ohio, Allegheny and Monongahela Rivers meet. It's actually called "The Point," which says a lot about what the waterways mean to the people of Pittsburgh. Their sports coliseum is even called "Three Rivers Stadium." So, it makes sense that Pittsburgh students are participating in a floating science lab called "Pittsburgh Voyager."

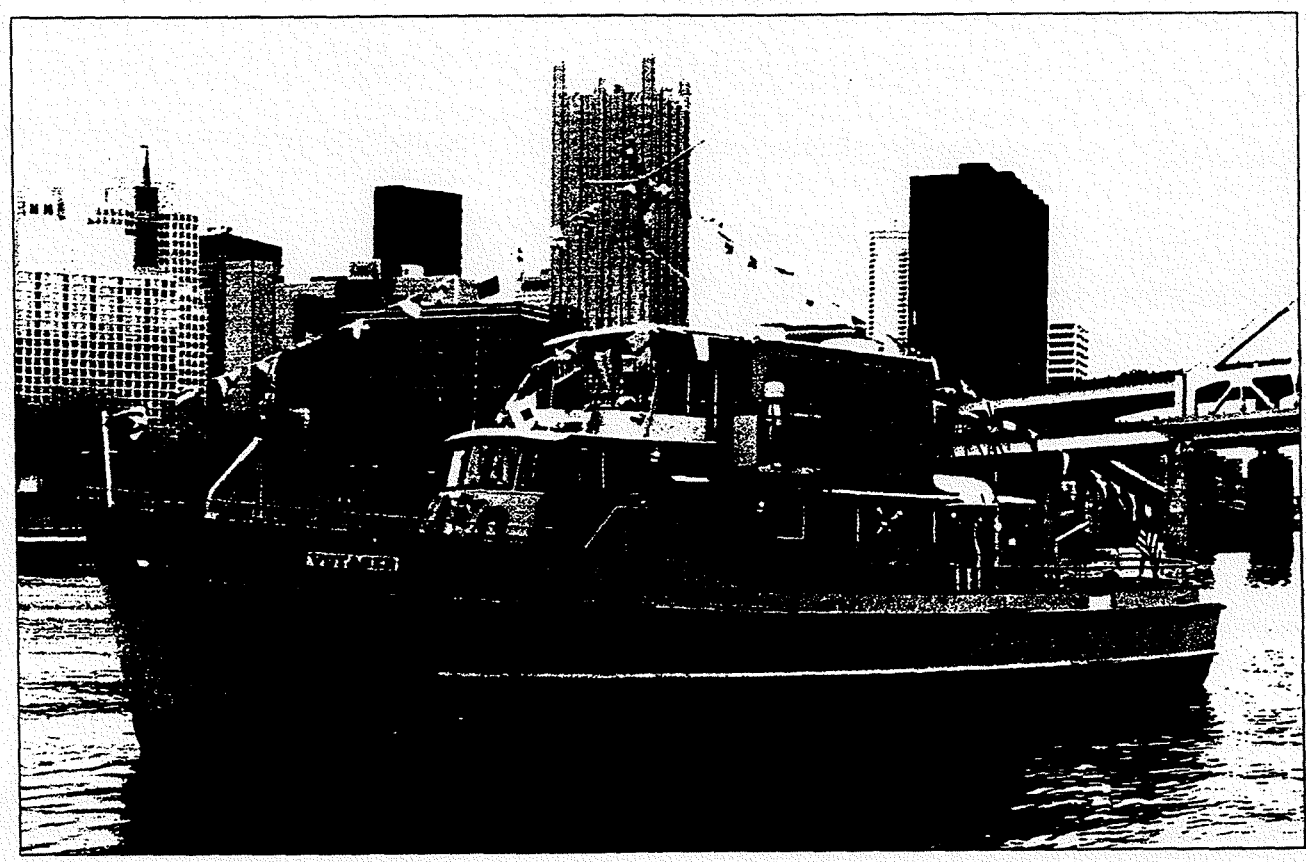
Pittsburgh Voyager is a non-profit organization whose flagship program, "Environmental Science on the Three Rivers," sets out to improve science, math and critical thinking skills by coordinating hands-on water ecology experiments along the Monongahela, Allegheny and Ohio Rivers.

THE FLOATING CLASSROOM

Work is done aboard a modified Navy training vessel equipped with navigation labs, an observation deck, a state-of-the-art computer system, research equipment and resource materials. The 80-foot, 70-ton vessel holds up to 35 students and stops at three major sampling stations on the rivers during a four-and-a-half hour class.

At the water chemistry station, students measure the water's physical components, such as turbidity, pH, dissolved oxygen and temperature. Another station calls for students to recover macroinvertebrates, including immature insects, from the bottom of the river. At the third station, students draw microscopic organisms —plankton—from the water and study them using a microcope in the on-board labs.

The program operates up to seven months yearly, skipping most



The Voyager sets sail on the Three Rivers beneath the Pittsburgh skyline.
Photos courtesy of The Pittsburgh Voyager.

DSW 137261

STLCOPCB4037216



During a summer camp on the Voyager, students "Point to Port."

A Floating Science Lab

of the summer and winter seasons. A second vessel, "Discovery," will begin operation in April.

Pittsburgh Voyager aims to "turn kids on to science and let them see science from a different perspective," says Beth O'Toole, the group's executive director. "We treat them like young scientists.

"Instead of reading about algae or pH or plankton in a textbook, they study these components of an ecosystem first-hand," O'Toole adds. "By the end of the day, they are answering the questions that they asked when they came on-board."

SCIENCE OUTSIDE THE BOX

These experiences come at a critical time for science education. Studies in recent years have shown that today's school curricula do not focus enough on science, and that national test scores in the sciences and math trail those in other nations. Two-thirds of the elementary school teachers who responded to a 1995 survey by the Bayer Corp., in Pittsburgh, for example, said schools should put more emphasis on science, particularly focusing on hands-on education methods. Nearly 70 percent of the parents who responded agreed that science education is important, but only 21 percent said the way it is taught – through textbooks and memorization – is "interesting, creative and exciting," according to the survey.

Such cynicism toward science education helped launch Pittsburgh Voyager. "A group of parents joined together in the early 1990s to trade thoughts on improving the scientific knowledge of students," says Patti Griest, the Voyager's education program manager, "The result was Pittsburgh Voyager which set sail in April, 1995."

Since then, more than 8,200 students from 93 Southwestern Pennsylvania schools—some from as far as two hours from Pittsburgh—have participated in the classes. Students come from public and private schools and the Pittsburgh Diocese, while others are from in home schools. The program accommodates fifth through twelfth grade students.

Grants from private contributors helped to establish Pittsburg Voyager. Continued support comes from program fees, regulatory agencies, foundations and corporate sponsors such as Aristech Chemical Corp., Ashland Chemical Co. and PPG Industries.

PREP WORK

Before the actual classes begin, students are given a preparatory course. Pittsburgh Voyager loans schools about $1,000 worth of instructional materials, including chemistry kits, that teachers can use to help prepare students for the Voyager. Teachers incorporate the materials –known as the "Captain's Chest" – into their classes, which are not limited to the sciences and also include English, math, geography, art and history courses, according to Griest.

DSW 137262

STLCOPCB4037217



Students conduct water sampling experiments while on-board Voyager.

"Each teacher teaches a little bit about Pittsburgh and the rivers, which impacts the particular course work and makes it all the more meaningful for the kids," Griest says. "It makes a much greater impact when teachers weave the on-board experience in with their classroom curriculum."

In fact, the preparatory work is one component of Pittsburgh Voyager that makes the group "unique" from similar water-based education programs.

CAPTAINS OF SCIENCE

Teachers accompany students on the boat, called Voyager I. There, they are met by the Pittsburgh Voyager "Master Corps of Teachers," people with science-related degrees and teaching experience, as well as college interns, who conduct the program.

While doing experiments, students are trying to put classroom theory into practical application, following the core Pittsburgh Voyager theme: "Show me, I'll forget; Tell me, I might remember; Involve me, I'll understand." They will make and test a hypothesis, comparing what is collected to known water parameters. For example, Griest says, students will refer to existing charts and ask, " 'Is the pH in the right range? Is this macro-invertebrate a good one or a bad one to find?' "

Griest says the older students can get "pretty sophisticated" with the data, comparing it, for instance, to other streams in the country. Younger students may be inclined to relate the experience more to a broad range of subjects, she says.

Students can also learn about the health of the rivers. Only 30 years ago, the Monongahela, Allegheny and Ohio rivers were "essentially dead" in the Pittsburgh area, mostly because of uncontrolled acid mine drainage and the continuous dumping of raw sewage, Griest says.

Implementation of strict Clean Water Act requirements since then, however, has reduced pollution in the rivers. In turn, the Pittsburgh Voyager experience allows students to discover that the water quality is better now than in years past, according to Jennifer Robertson, a member of the "Master Corps of Teachers." She completed her Master's Degree thesis at Slippery Rock University in Pennsylvania, based on interviews she conducted with teachers whose students participated in the program.

"In talking to teachers, it became apparent that Voyager makes kids excited about science," Robertson says. "We've had teachers tell us that coming on Voyager has gotten students interested in science professions."

Students say the same thing. One high school student told Pittsburgh Voyager that the experience has "helped me decide on what major I would like to study in college. With the knowledge that I have learned I would like to become a water ecologist."

Pittsburgh Voyager, Robertson says, shows that experiential learning works. "Students are 'experts' when they leave here," she says. "They haven't just sat and been told. They've gotten down and dirty and picked through the mud."

If the percentage of aquatic biologists, environmental educators and other science professionals rises in the next few years, Pittsburgh Voyager can definitely take some of the credit. CB

Is there an "Outside of the Box" science program like Pittsburgh Voyager in your area? Write to ChemEcology *MailBag and tell us about it. Your school may be featured in an upcoming issue!*

DSW 137263

STLCOPCB4037218

SOLUTIA EDUCATION CONNECTION



A Technology Partnership With Alabama Schools

DSW 138379

STLCOPCB4037219

SOLUTIA EDUCATION CONNECTION



A Technology Partnership With Alabama Schools

DSW 138380

STLCOPCB4037220

Food Allergies

BY JUDY DASHIELL

"Does that have nuts in it? I'm allergic to nuts." For most people, eating a peanut butter cookie is not life-threatening, but for someone who is severely allergic to nuts, as little as half a peanut can cause a fatal reaction, according to the Food Allergy Network, Fairfax, Virginia.

A food allergy is the immune system's reaction to a certain food, when the body creates IgE antibodies to that food. When these IgE antibodies react with the food, histamine and other chemicals (called mediators), are released from various cells within the body. These mediators are what cause hives, asthma or other symptoms of an allergic reaction.

Up to five percent of children have food allergies, which shouldn't be confused with food intolerance, an adverse food-induced reaction that does not involve the immune system. Lactose intolerance is an example of a food intolerance. When a person is lactose intolerant they lack an enzyme that is needed to digest milk sugar. Milk products may give them symptoms of gas, bloating and abdominal pain.

FOODS ALLERGENS

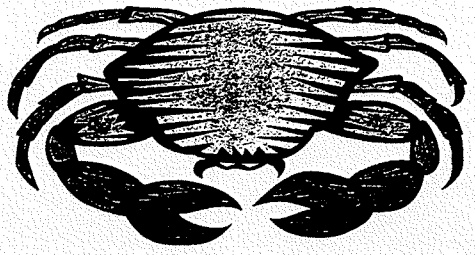
More than 90 percent of all food allergic reactions are caused by eight specific foods. They are shellfish, soy, milk, eggs, tree nuts, peanuts, wheat and fish. Milk is the most common cause of food allergies in children, but nut and fish allergies cause the most severe reactions. Unfortunately, there is no cure for food allergies. The only way to prevent a reaction is to strictly avoid the food which causes the allergy. This isn't easy because it means knowing every ingredient in everything you eat. For kids, this usually means having parents and teachers keeping close tabs on children with food allergies. Some children may feel embarrassed over all the attention. Classmates might think, "What's the big deal?" But it can be a very big deal. Some severely allergic children can have a reaction if milk is splashed on their skin. And even being kissed by someone who has eaten peanuts could cause a reaction to a person who is severely allergic.

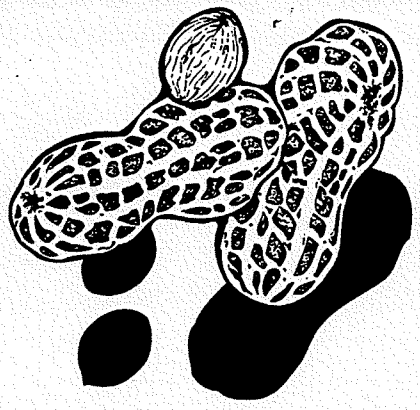
ANAPHYLAXIS

A severe allergic reaction is called an anaphylactic reaction. Anaphylaxis is a sudden and severe, potentially life-threatening allergic reaction. It can be caused by food allergy, insect stings or medications. Symptoms can include hives, swelling (especially of the lips and face), difficulty breathing (either because of swelling in the throat or an asthmatic reaction), vomiting, diarrhea, cramping and a fall in blood pressure. These symptoms can occur in as little as five to fifteen minutes. Sometimes as little as 1/5 of a teaspoon of the food can cause an anaphylactic reaction. People with known food allergies often carry epinephrine medication which controls the symptoms after an attack.

FOOD ALLERGY NETWORK

The Food Allergy Network (FAN) is a national non-profit group established to help families living with food allergies and to increase public awareness about food allergies and anaphylaxis. FAN provides education, coping strategies and emotional support. For more information contact FAN at 10400 Eaton Place, Suite 107, Fairfax, Virginia 22030-2208 or visit their website at www.foodallergy.org. CB





DSW 137264

STLCOPCB4037221

A Student's Voice IMPACTS HER COMMUNITY

By Mary Anna Grove

"I used to look at the smoke coming from Cytec's facility in Wallingford when I'd be driving by with my family, and we would comment about it," says Erica J. Bushey, a senior at Sheehan High School in Wallingford, Connecticut.

"But after attending my first Cytec Industries' Community Advisory Panel (CAP) meeting," Erica says. "I was surprised with everything that Cytec is doing to make things safer for both their employees and our community.



Erica J. Bushey

A CAP is a group of individuals who represent the fabric of their community and who have made a commitment to meet with the management of the local chemical manufacturing facility on a regular basis to discuss issues of mutual interest. It is a forum for open and honest dialogue between citizens and site management to break down stereotypes. CAPs are an independent body not controlled by the plant or the industry, but supported and encouraged by the site. Erica is the newest member of Cytec Industries' CAP.

"Cytec is really concerned about how the community perceives it. The company wants to make sure people understand what they're doing and don't have any misconceptions about the facility.

"I feel like I can ask questions or bring up concerns that I or other students may have about the industry in our community."

The program allows members of the community to share their concerns about the environment, potential risks involved with living near a chemical plant or plant expansion. Panel members work with facility management to make meaningful changes in the way the plant communicates with the community regarding emergencies as well as other operational issues.

"CAP on CALL" is one example of how a CAP assists with communication between the plant and community. Cytec arranges for different CAP members to be responsible for answering questions each month regarding Cytec's facility and operations. The phone number is published in the local newspapers and anyone can

DSW 137265

STLCOPCB4037222

call in with questions. Assistance with gathering information to answer questions is provided by Cytec management. This is the first project Erica will partake in as a member of the CAP.

"I'm looking forward to this opportunity," says Erica. "Sometimes the discussions at the CAP meetings get complicated. But it is very interesting to listen to the various concerns raised by adults and to observe interaction between the chemical industry and the community. Not only am I answering questions posed by the community, but I'm learning about Cytec as well."

"My high school principal asked me if I would be interested in serving on Cytec Industries' Community Advisory Panel (CAP) because of my position of leadership with the student council," she explains. "I thought it would be a good opportunity to learn about the industry's role in my community as well as voice my own concerns."

Erica is a member of the National Honor Society, vice president of the Student Council and captain of both the indoor and outdoor track teams. In addition, she is a Governor's scholar and teaches Sunday School. She plans to study biology at Connecticut College this fall.

"Erica was chosen not only for her accomplishments at heehan High School," says Richard J. Krakowski, director of Global Manufacturing for Cytec's Coating and Resin Products Division, "but for her interest and concern for the Wallingford community."

"I have an interest in studying biology because I love animals and wildlife," says Erica. "When I attended 'Shadow Day' at Cytec, I was able to watch biologists work in the wastewater plant to see how the water is cleaned before it is sent back out."

"I was able to see how the safety of the environment is taken into consideration at a chemical facility," she adds. "Looking through the various bacteria in a microscope showed me how biology is used in the chemical industry and increased my knowledge of career opportunities."

Shadow Day is a program at Cytec that offers students the opportunity to explore various careers within the industry by shadowing employees for one day.

Krakowski, who is responsible for leading the CAP meetings, says Erica will be involved in other CAP projects as well. "Erica is the third student we have had serve on our CAP. We meet bimonthly with the summer off. The CAP consists of ten members of the Wallingford community with representation from business, education and government agencies, as well as local residents and students."

CAP members take part in other events throughout the year. They are a part of the biyearly open house when the community is offered plant tours and an opportunity to view products that are made with the chemicals produced at Cytec. CAP members also occupy a booth at "Celebrate Wallingford," an annual town event. In addition, CAP members are present at Cytec's annual meetings during which the facilities' emissions results are presented. This offers the community a direct opportunity to ask questions and raise concerns about Cytec's pollution prevention program.

"Serving on Cytec Industries' CAP offers me a chance to learn more about industry while sharing my concern for Wallingford with other members of the community," says Erica. "I encourage other students to share concerns about the environment, health and safety issues of their communities as well."

For information about CAPs in other communities, contact Portia Krebs at (703) 741-5842. CE

Chemical Education Resources

If you are interested in a closer look at the chemical industry, try taking a chemical facility tour, participating in a Shadow Day or one of the many other programs offered by the chemical industry to students throughout the United States. The Education Resource Guide, published by the Chemical Manufacturers Association, has a listing of chemical plants that offer such programs. Many schools take advantage of the opportunity to see science at work.

The listing provides the location of the plant, contact information and topics covered in the tour. The plant facilities offer a variety of tour options, some of which are specially designed for students. Others focus on ideas for teachers to incorporate in their lesson plans. Many of the plants listed are involved in partnerships with area schools and provide additional assistance to the classrooms such as tutoring and mentoring programs.

The 160-page Guide also contains information on teacher workshops, internships, scholarships and awards, summer employment for teachers and students, equipment donations, research support and more. To obtain a free copy of the Guide, contact Hope Bonito at (703) 741-5826 or email hope_bonito@mail.cmahq.com. Sections of the Guide will soon be available on CMA's website <www.cmahq.com> under CMA Resources. CE

DSW 137266

STLCOPCB4037223

HUT, TWO, THREE, FOUR! BREAD STAYS FRESH THREE YEARS OR MORE



Amosorb® oxygen scavenger used in a "meals ready to Eat" (MREs) pouch is designed to provide a 3-year shelf-life for bread.

Anyone who's served in the military is familiar with "rations," packaged food—canned, pouched, dehydrated and otherwise processed—meant to be consumed in the field. Known as MREs (Meals Ready-to-Eat) in the US, they are developed with convenience and shelf-stability in mind. The last thing hungry soldiers expect in MREs is fresh food, but that's what they'll get with a new packaging technologically jointly developed by Cadillac Products, the U.S. Army Natick Research, Development and Engineering Center and Amoco Chemicals.

The team developed a bread pouch which provides a projected three-year shelf life and was among the winners in the 10th annual DuPont Awards for Innovation in Food Packaging. The critical ingredient of the award-winning package is Amosorb® oxygen scavenger, a developmental plastic concentrate from Amoco Chemicals that absorbs oxygen in food and beverage packages.

Amosorb® scavengers can be incorporated into a range of package structures, including flexible film, closure liners and the walls or lid of rigid containers. In the MRE bread package, Amosorb® scavenger was incorporated into a layer of the foil trilaminate film used to form the pouch. The Amosorb® scavenger reduces oxygen inside the pouch to retain freshness, reduce aerobic microbial growth and provide the minimum required military shelf-life of three years at 80°F. Oxygen in the headspace of a package accelerates food degradation, resulting in loss of freshness, appearance, taste and nutrition. The bread packaged with Amosorb® maintained lower headspace oxygen levels during extended shelf-life testing than other packaging systems.

Because Amosorb® becomes an integral part of the package, it offers safety benefits as well, eliminating the need for loose oxygen scavenger sachets which may be accidentally ingested or broken.

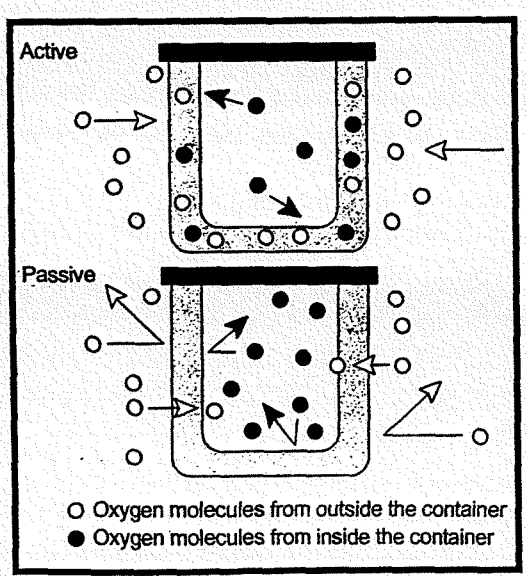
While the U.S. military continues to work with Amosorb® oxygen scavenger for packaging a range of other oxygen sensitive ration components, companies around the world are also discovering this new material. Working with Amoco, they are finding Amosorb® is a versatile and cost-effective complement to traditional packaging materials.

Amosorb® scavenger actively reduces the amount of oxygen in a package, as opposed to a passive barrier which only slows permeation of oxygen. Oxygen residing in the package, when sealed, remains with a passive barrier system. An active barrier system containing Amosorb® absorbs oxygen that permeates the package over time. Amosorb® is also able to handle temperature extremes, making it well suited to demanding applications such as microwavable, retort and refrigerated food packages.

Amosorb® scavenger can easily be incorporated in flexible, rigid and closure packaging systems and is available in various grades, based on the final application and resins used, so that it is compatible with existing plastic packaging processes.

Effective and easy to use, a little bit of Amosorb® scavenger can make a big difference in taste for everyone from soldiers to civilians. CE

Reprinted with permission from Chemical Reactions, a magazine forum of innovations in the chemical industry published by Amoco Chemicals.



Amosorb® scavenger removes oxygen from the interior of the package to levels lower than initially present. *Photos courtesy of Amoco Chemicals.*

DSW 137267

STLCOPCB4037224

An New World



A World War II-Vintage advertisment for Dow Magnesium. *Courtesy Post Street Archives.*



A rendering of corrosion damage to the head of the Statue of Liberty. *Rendering by Robert Laverdiere. Courtesy Robert Baboian.*

By Nikki Naylor

Batteries. Silverware. Computer Components. Everyday items to you and me, but they represented an amazing new world to Napoleon Bonaparte, Lubomyr Ramonkiew and Michael Faraday.

Napoleon, former Emperor of France, thought batteries were so fascinating that when inventor Alessandro Volta, an early pioneer in the field of electrochemistry, showed him this new invention, Napoleon insisted on serving as Volta's lab assistant for the next demonstration.

Silverware builds on the same basic science. Specifically, electroplating, a process by which base metals are coated with thin layers of a more precious metal. Before electroplating came about in the early 1800's, only the wealthy could afford silverware; this new method changed that. Much later in time a new form of electroplating was developed by Lubomyr Ramonkiw at IBM to make smaller, cheaper computer components.

In 1834, Michael Faraday, pioneer in electrochemistry and inventor of the electric motor and electromagnetic generator, published two laws of electricity. The 164-year-old laws are still fundamental to today's industrial electrolytic production.

The foil packages and cans of food you use every day are evidence that aluminum is one of the most common materials in use today. Believe it or not, metallic aluminum was once considered a semi-precious metal. At that time, natural aluminum ore was very difficult to reduce to its metallic state. Electrochemistry came to the rescue in the form of the electrolytic process. This method involved dissolving aluminum oxide in fused cryolite. It worked so well that the price of aluminum fell from $8 per pound to 30 cents...in less than 8 years.

Electrochemistry also came to the rescue of Lady Liberty. The Statue of Liberty is protected on the outside by a naturally occurring protective patina. Inside, however, corrosion caused serious problems. By the statue's one hundredth anniversary, nearly half of the internal frame had rusted away. This damaging corrosion can now be prevented. In the restored statue, one step taken to prevent deterioration was using stainless steel rods insulated with teflon® to connect the iron frame to the copper skin.

The Dow Chemical Company used electrochemistry to extract magnesium from seawater, supplying the material to make lightweight alloys for use in airplanes. In fact, The Dow Chemical Company was one of the earliest to utilize the potential of electrochemistry. It began with Herbert H. Dow, an inventor who developed an electrolytic process to extract bromine from Michigan brine wells. Dow sold the extracted material to makers of medicine and chemicals for photography. Dow's next project was developing a cell to produce chlorine. On the basis of that invention, he formed The Dow Chemical Company. That was 1897. One hundred years later, The Dow Chemical Company is still using electrochemistry.

The Chemical Heritage Foundation (CHF), Philadelphia, is the keeper of such historical scientific lore. The information above included in a book published by the CHF. *Chemistry is Electric!* was put together in celebration of the centennials of the Electrochemical Society and The Dow Chemical Company," says Mary Ellen Bowden, senior research historian for CHF, and author of the publication (Daniel Flaumenhaft, research assistant, contributed). The booklet accompanies an exhibit of the same name produced by the CHF, and was supported in part by a grant from the Midland Foundation.

Anyone interested copies of Chemistry is Electric! should contact the Chemical Heritage Foundation, 315 Chestnut Street, Philadelphia, Pennsylvania 19106-2702 or telephone (215) 925-222, ext. 222 or fax (215) 925-1954. The publication is $12, with a 20% discount for those ordering more than 20 copies.

The Chemical Heritage Foundation was established in 1982 by joint action of the American Chemical Society and the American Institutes of Chemical Engineers. More information about CHF can be found by visiting its website at <www.chemheritage.org>. Or, reference ChemEcology, May 1996, Volume 25-Number 4. CB

DSW 137268

STLCOPCB4037225

Learn Your Living

By Mary Anna Grove

What would you do with $850? You could buy clothes, a new mountain bike or an electronic game...But what if that figure represented all of the money you earned in a month's time, and you had to pay rent, utilities and buy groceries?

This amount is slightly more than what your total monthly income would be if you worked full-time in a position paying minimum wage.

Since you began school, you've heard about the importance of a good education from your teachers, family and guidance counselors. In Texas, local business representatives are visiting classrooms to tell students that if they want to earn a good living after graduation, they better start learning a living today.

Many students are taking the advice seriously. Today's business environment is a flurry of nonstop innovation; intense, unending competition; rapid advancement in technology; and globalization. The market demands that companies have well-educated, skilled individuals to succeed. Students can no longer take consumer mathematics and watered-down language arts courses and be guaranteed a good job after graduation.

In 1997, 57.3 percent of companies nationwide reported a shortage of skilled workers, according the National Association of Business Economists. That's up from 19.6 percent in 1994. This increase raises concerns for industry about America's ability to compete in a global economy.

Deer Park High School in Deer Park, Texas, is one school working with area businesses to improve the quality of future employees. When students reach the eighth grade, they are presented with the realization that if they limit their education, they limit their career options.

Harold L. Smith, Process Improvement department manager at Lubrizol's Deer Park facility, works closely with students encouraging them to complete a more rigorous course of study in high school as well as to be aware of their attendance and behavior.

"We stress during the eighth grade presentation that not only is it important to take classes that are challenging, but attendance and personal conduct is just as important," he says. "A student's attendance and ability to interact with others reflects how that student



Using household budget samples, Joe Randolph, manager of Training at Eastman Chemical Company, and Texas Scholar Volunteer, explains to area eighth graders the connection between a good education and a financially rewarding career.
Photo courtesy of Eastman Chemical Company.

DSW 137269

STLCOPCB4037226

will later perform as an employee. It's not just the diploma that matters. Transcripts tell the real story to employers."

Why struggle through an Algebra I course and obtain a "C" when you can get an "A" in a consumer math class? Employers will be quick to tell you that the "C" shows initiative. "I'd rather hire a youngster who makes a 70 in algebra, geometry or trigonometry than one who makes a 98 in some rinky-dink course," says Joe Randolph, manager of training at Eastman Chemical Company in Longview, Texas.

In other words, if businesses have a choice between an applicant with a 3.5 (out of a 4.0) GPA who has taken only the easiest classes, and an applicant with a 2.5 GPA who has taken courses like foreign language, physics, chemistry and trigonometry, most will choose the 2.5 GPA. Why? Because that student has taken the more challenging, balanced curriculum. In today's job market, new employees with educational preparation are highly valued.

Dr. Gerald Wheeler, executive director of the National Science Teachers Association, says "We know that by the time students enter seventh grade, more than half say they are not interested in science." Add to this that in 1997, U.S. eighth grade students ranked 17th in Science and 28th in Mathematics in the Third International Mathematics and Science Study, it is only natural that both educators and business representatives would have concern about the future work force.

Furthermore, Texas Scholars, as it's called in Texas (and a similar program in Northeast Tennessee and Southwest Virginia named AIM Scholars) is a program not only suggested to students taking advanced placement courses or planning for a four year college education. It is designed for students who plan to attend a technical school or two year college as well. The program prepares students to go in any direction after graduation, including entering the workforce immediately.

The program encourages students to take the following:

- **four credits of English;**
- **four credits of Mathematics, including Algebra I and II and Geometry;**
- **three credits of science including two of either Biology I, Chemistry I or Physics I;**
- **three credits of history/government;**
- **two credits of a foreign language; and**
- **one elective of either a science, foreign language or computer course.**

A "C" or better is required in each of these courses to maintain the Scholars ranking.

Smith uses the following analogy to stress the need to prepare for your career early, "When a football team wins a championship, do they say they just got lucky? No. They stop to consider that the accomplishment was a result of practice, preparation and hard work."

"A successful career and a good living require preparation and hard work as well," he adds. "Chances are that most of you won't just get lucky."

Incentives for Deer Park students who choose to enter the Scholars program include an annual directory of Scholars published for the community; monthly meetings with guest speakers addressing various issues including diversity, team building and career skills; participation in the Deer Park's Chamber of Commerce Fall Festival; and special recognition at high school graduation.

"Realizing just how crucial my education is to me and how much more I will benefit from it in the future has made me do extensive thinking on the kind of person I aspire to be and the dreams I hope to capture," says Cynthia Gonzales, a graduate of Deer Park High School. "Thanks to the Texas Scholars Program, I now know that if I put my mind to achieving a set of goals, it will become the start to a positive trend in overcoming future challenges.

"When I first learned of Texas Scholars in the eighth grade, I had no idea it would take me as far as it has. It not only allowed me to set high expectations for myself, but it has also aided me to surpass them. Without becoming a Scholar, I would never have known the importance of time management that comes with taking upper level courses. Besides structure, I had to challenge my mind to learn and comprehend classes such as Calculus and Physics. By being in such courses, I supplied my brain with the knowledge that is necessary to become a successful Hispanic woman of the future, not only in my career, but in the household.

"What many fail to understand when they turn down the chance to be a Texas Scholar, is that it does not mean taking a bunch of hard classes, it is a call to students to enrich their lives through the help of a program made especially for them," she says.

Cynthia is now a successful student at the University of Texas at San Antonio.

For more information on beginning a similar Scholars program in your school, contact Joe Randolph of Eastman Chemical Company at (903) 237-5006. CB

DSW 137270

STLCOPCB4037227

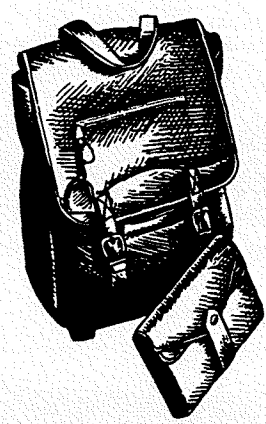
CHEM NOTES

PAPER TOWELS VS. DRYERS

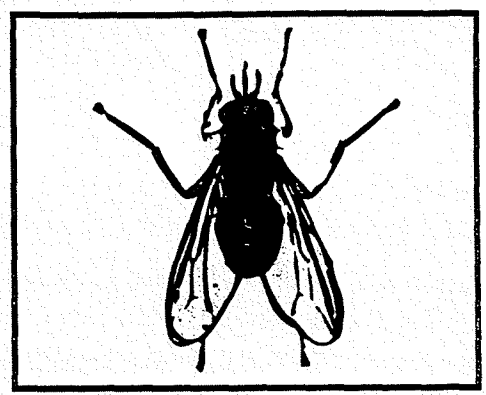
When using public restrooms, have you ever wondered which was more environmentally friendly: paper towels or electric dryers? This question is almost impossible to answer because of all the variables that are involved. The wattage of the dryer tells us how much energy it uses. Where dryer's electricity comes from affects how environmentally friendly the hand dryer is. If the power supply comes from an environmentally friendly source, the dryer is more energy efficient. Paper towels also vary in their environmentally friendliness. What the towels are made of, how they are disposed of, and whether recycled or incinerated effect the environment in different ways. However, the most important consideration when drying your hands may have less to do with the environment and more to do with your health.

Using an electric blower to dry your hands is not an effective means of cleaning your hands. Using soap and water loosens dirt and bacteria from your hands so that wiping them with a cloth can sweep it away. Electric dryers do not take the bacteria away. They simply dry it in place. CB

A HEAVY LOAD



Children who carry backpacks that weigh more than 10-15 percent of their total weight may strain their upper backs, shoulders and necks, according to the New York Times. A good experiment to try at home or in the classroom is to compare your body weight to weight of the backpack you carry. Weigh yourself and then your pack. Take the weight of your pack and divide it by your body weight. You will get a number behind a decimal point. Move the decimal two places to the right to get the percentage. Is it more than 15 percent? CB



SHOO FLY

At Brown University, Providence, Rhode Island, scientists have provided evidence that a class of proteins plays a role in extending life—at least in fruit flies. The study was published in Nature by Marc Tatar and colleagues from the University of Minnesota. By exposing the flies to heat stress, the flies lived longer than those that were kept at normal temperatures. It is possible that a mechanism for aging is involved because the capacity to moderate stress is a central function to regulating the aging process.

The flies that were exposed to heat produced a protein named hsp70. The scientists then bred flies that carried extra copies of the hsp70 genes. When they were exposed to warmth, they produced more hsp70 which substantially increased their life span. Although these heat shock proteins increased the life span of fruit flies, you shouldn't think that people will live longer by doing the same thing. However, it does provide a stepping stone to increasing the understanding of genes that cause aging. CB

DSW 137271

STLCOPCB4037228

Green Chemistry Conference & Awards Program

Green chemistry is a term that describes how chemicals can be made or used in ways that don't pollute our environment. In developing new technologies, many companies have found that using green chemistry can be a great way to decrease the pollution from a chemical or a process. In order to recognize and encourage such new technologies, The Presidential Green Chemistry Challenge Award was established in 1995. Awards are given for technologies invented by companies and universities that incorporate environmentally-beneficial principles into chemical design, manufacture and use.

This year, the Green Chemistry Challenge awards presentation will be held June 29 and be followed by the 2nd Annual Green Chemistry and Engineering Conference: Global Perspectives, June 30-July 2, 1998, at the National Academy of Sciences in Washington, D.C. The conference will allow scientists from around the world to share their most recent advances in green chemistry technologies.

Green Chemistry technologies that have won Presidential Green Chemistry Awards in previous years include:

Rohm and Haas Corporation designed a marine antifoulant to clean the bottom of boats that is biodegradable and less toxic than other such treatments.

The Monsanto Company developed a new way to manufacture its herbicide that eliminates hazardous substances such as formaldehyde and cyanide.

Dow Chemical Company developed a new way to manufacture foam products that eliminates greenhouse gas emissions.

Right now, judges are considering the entries for this year's awards and deciding the winners. The 1998 Presidential Award Winners will be announced in an upcoming edition of *ChemEcology*. CB

ChemEcology's 'Net Worth Teacher's Survey

Educators:

CMA is considering expanding *ChemEcology* as an internet resource. Please answer the following survey and fax it back to 703-741-6807.

Do you have easy access to a computer/printer?	**Yes / No**
Do your students have access to computers in the classroom?	**Yes / No**
Do you have internet access?	**Yes / No**
Are you familiar with the Internet/World Wide Web?	**Yes / No**
Are you comfortable using the internet as a resource?	**Yes / No**
Do you like having *ChemEcology* available on the internet?	**Yes / No**
Should CMA provide more resources for teachers?	**Yes / No**
Do you use the Internet as an education resource?	**Often / Sometimes / Never**

Would having *ChemEcology* available ONLY on the internet affect your use of the magazine? How?

What sort of resources would you like to have made available on the internet?

DSW 137272

STLCOPCB4037229

ChemCAREERS

by Karen Morris

Featuring Children's Science Book Author Vicki Cobb



"You have to live with uncertainty and be able to invent yourself. You have to be able to live without someone making the rules for you," says Vicki Cobb, children's science book author.

This is exactly what Cobb has done with her life. In her youth, Cobb didn't know if she wanted to be a scientist or an artist she had a passion for both disciplines. As a children's science book author, Cobb has combined her two talents to bring children creative new ways to learn and appreciate science.

Cobb was a zoology major at Barnard College and went on to receive a Master's from Columbia University in Secondary Science Education. She taught as a science teacher for five years, then went on to conduct cancer research in a laboratory and worked in a hospital laboratory. After working as a research scientist, Cobb experimented with other careers.

"I had a nationally syndicated show called 'Science Game' in the early 1970s; we produced 23 half-hour episodes." Cobb explains. As well as working on TV, Cobb worked behind the scenes as a writer for "Good Morning America" and was a journalist.

Things changed for Cobb when she decided to start raising a family and wanted to stay home with her children. "I started raising a family and wanted to be able to make money." she says, "I saw an ad in the paper for teachers to write Cliff Notes and one thing led to another."

From these humble beginnings Cobb realized that there was a means to combines her love of writing and science. She started writing science books for kids against the advice of others: She was told that she couldn't make a living out of it. In 1972, she wrote Science Experiments You Can Eat, published by HarperCollins (to see one of Cobb's experiments check out Teacher Topics on page 15). The book became extremely popular and sealed her fate as a children'sscience book writer. Approximately 65 books later, Cobb is still writing.

Writing for Cobb was a very different kind of career. She had to learn a very different kind of craft. Writing children's science books give her the opportunity to change from being a "player" in the field to becoming a "playwright."

Writing also offers Cobb a great deal of freedom. "I do whatever I want to do; I have a lot of control over my job; and it is very creative. You really have to be a self-starter to do this kind of work." Cobb says there is also a negative to this field of work, "You have no regular salary, and you do not know when a paycheck is coming in."

The work also offers Cobb an opportunity to travel. She has developed children's shows and has become a keynote speaker. She loves the fact that she is able to work her hobbies, (such as skiing), into her job's travel schedule.

When giving advice on pursuing an independent career as a writer, Cobb has a lot to say. In her case, she figured out how to make a good living by combining her passions of writing and science. Her life has always included both science and the arts, and she found a way of combining the two into one career. In that respect, Cobb has been very fortunate.

Cobb has four more books coming out in the Spring. You can check out her website for more information on her upcoming books and other experiments to try at home, http://www.web-shop.com/vcobb. CB

DSW 137273

STLCOPCB4037230

COBB'S RED CABBAGE INDICATOR

A sour taste is one indication of a type of solution called an acid. The word acid comes from a Latin word meaning sharp or biting to the taste. Acids also conduct electricity. A light bulb connected by wires to two electrodes will light up when the electrodes are submerged in an acid. Acids are not the only solutions that conduct electricity. Bases, also called alkalies, do the job as well.

Acids are present in many of the foods we eat. Lemon juice and vinegar are good examples. We also eat certain bases, although they are not as common as acids. Baking soda, for example, is a base when it is dissolved in water.

There are, of course, many stronger acids and bases that we don't eat because they are poisonous or extremely damaging to living tissues. Tasting is not a test used by chemists to determine whether or not a substance is an acid or a base. Instead, they use a dye called an indicator that changes color depending on what the solution is. Litmus paper turns blue when it is dipped in a base and pink when it is dipped in acid.

The pigment in red cabbage can be used as your own personal "litmus." Here's how to make some red-cabbage indicator.

MATERIALS AND EQUIPMENT

1 whole red cabbage
water
a knife
a grater
2 large bowls
measuring cups and spoons
a slotted spoon
a strainer
a very clean glass jar and cover
a small white dish

PROCEDURE

Cut the cabbage into quarters. Grate it section by section into a large bowl. Add between 1 and 2 cups of water, enough to cover the cabbage. Let the cabbage stand in the water, stirring occasionally, so that all the cabbage is moistened.

When the water is a strong red, remove as much of the grated cabbage as you can with the slotted spoon and save it in your second bowl. Pour the water solution through the strainer into the glass jar. Add the strained cabbage to the rest of the cabbage you have saved.

Put about a tablespoon of your cabbage-juice indicator into a small white dish. Test for an acid by adding a substance you know to be a base (baking soda). Again notice the color change. Pretty gorgeous! Now add acid to the base-and-indicator mixture to reverse the color change. What happens when you add base to the indicator showing the acid color? An acid and a base will react with each other to neutralize each other. The original color of the red cabbage is pretty close to neutral. Now you can test some foods to see which category they fall into. Here is a list to get you started:

Cooking water from boiled vegetables, including beans, peas, onions, carrots, turnips, celery, asparagus, etc.
Liquids from canned vegetables and fruits

- Cream of tartar
- Soda pop
- Egg whites
- Fruit juices
- Tomatoes
- Cottage cheese CB

Red Cabbage Indicator is reprinted with permission from "Experiments You Can Eat," by Vicki Cobb.

DSW 137274

STLCOPCB4037231

ChemEcology is published by the Chemical Manufacturers Association, 1300 Wilson Boulevard, Arlington, Virginia 22209, ISSN 0738-7776

CMA is a non-profit trade association serving members in the United States and Canada.

EDITOR: Judy Dashiell
ASSOCIATE EDITOR: Mary Anna Grove
EDITORIAL ASSISTANT: Karen Morris
TECHNICAL ADVISORS FROM INDUSTRY:
Dave Gustafson, the Dow Chemical Co.
Lynn Johnson, Rohm and Haas Co.
Vivian McIntire, Eastman Chemical Co.

Except for articles and materials that are specifically copyrighted (designated with the copyright symbol ©), no special permission is required to quote or reproduce from this publication. Credit is appreciated when reproducing non-copyrighted articles and materials.

Please contact the editor at (703) 741-5807 for permission to reprint copyrighted articles and materials.

For subscription changes or additional copies, please contact Karen Morris at (703) 741-5808, fax your request to (703) 741-6808, or send an E-Mail message to Karen_Morris@mail.cmahq.com.

Responsible Care® is a voluntary chemical industry initiative designed to improve the management of chemicals.

Responsible Care®
A Public Commitment

Printed on recycled paper
Printed in the U.S.A.

CHEM ECOLOGY

Chemical Manufacturers Association
1300 Wilson Blvd
Arlington, VA 22209

CHEM ECOLOGY mailbag

In my many years of teaching chemistry and physics, I observed that the laboratory investigations that created the most enthusiasm were those that cast the student in the role of crime lab analyst. Rather than lockstep procedures to verify expected outcomes, I present experiments as criminal case descriptions which require careful evidence analysis.

Questions like "Was the anesthesia administered in too great a concentration?" or "Does the index of refraction of the glass chip imbedded in the robbery suspect's shoe match the glass from a broken store window?" frame experimentation in a real world context.

This approach became so popular that I now teach four sections a year of a class titled Criminalistics-Introductory Forensic Science. I have also assisted teachers regionally in establishing crime lab courses. English instructors are particularly enthusiastic about this approach and often initiate cross-curriculum mystery writing units.

Jim Hurley
Waverly- Shell Rock High School
Waverly, IA

Editor's Note: Send your letters in to the ChemEcology Mailbag, attention Karen Morris, email address: Karen_Morris@mail.cmahq.com CB

**********5-DIGIT 63141
STEPHEN LITTLEJOHN 194848
MONSANTO COMPANY 18/9-3171
F3EE
800 N LINDBERGH BLVD
SAINT LOUIS MO 63141-7843

BULK RATE
US POSTAGE
DULLES VA
PERMIT# 21

DSW 137275

STLCOPCB4037232