

SEP Newsletter

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SEP Bids Fond Farewell to Margaret Clark

The SEP office just won't be the same without the lilt of a gentle Tennessee accent and the grace of Margaret Ransom Clark. After 25 years of service to the University – six of which were spent with SEP – Margaret is retiring this summer.

Margaret first became involved in SEP through working with students and teachers as a volunteer at Hoover Middle School and through City Science. When she signed up to be a City Science Scientist for the first-ever CS Summer Institute in 1991, fortune brought Annabelle Shrieve and Margaret together as presenter-partners. At the time, Annabelle was the City Science Resource Teacher and Margaret was a Professor-in-Residence. With Annabelle's interest in science and Margaret's in education, theirs

was a formative partnership. "I remember I was very moved by a math teacher who shared the story of her transformation in teaching math," Margaret remembers. "And I had the opportunity to watch Annabelle's ways of working with the teachers and how sensitive she was. It set the tone for me."

She was hooked. Margaret left her position in the Department of Laboratory Medicine. "In the lab, it felt like I was adding one more detail to something that doesn't make a difference. City Science makes a difference in peoples' lives." In the fall of 1991, she was named SEP Academic Coordinator for High School Programs. Within a year, she was promoted to the position of SEP Director.

In her tenure as Director, Margaret has successfully submitted grants for SEP programs to the Howard Hughes Medical

Institute, the National Science Foundation, and the National Institutes of Health, among others. She was the leader for the SFUSD/UCSF team at the National Sciences Resource Center

Science Leadership Institute, chaired the UCSF Committee on Equal Opportunity, and has served on several federal study sections for science education programs. Currently, she is a member of the California State Science Standards Committee. Art Sussman, former SEP Director and now with FarWest, is also involved in the State Standards. "It's been really great to have her on the committee," commented Art, "because of her expertise in both physical and life sciences." Art is impressed with the breadth of her experience, ranging from working with middle school youngsters to working at the

state level. "It's unusual to have that wide breadth of scientific knowledge and a knowledge of what's appropriate with kids. That coupled with her enthusiasm . . . she's a lovely person to work with."

In 1994, Margaret opted for the Very Early Retirement Incentive Program (VERIP) at UCSF. She recommended that Liesl Chatman, then SEP Middle School Program Coordinator, be named as Executive Director. The first thing Liesl did in an official capacity was to recall Margaret to coordinate the scientists involved with City Science. "With my tendency to charge forward," noted Liesl, "I needed Margaret's balance – her patience and quiet reflection. I counted heavily on her for guidance. I still do."

The SEP staff counts on Margaret for many things. Salient

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The Science & Health Education Partnership (SEP) is a collaboration between the University of California, San Francisco (UCSF) and the San Francisco Unified School District (SFUSD). Its mission is to support high quality science and health education. SEP is the organizational umbrella for the UCSF-end of the partnership and is made up of both core programs and specially funded projects. Core programs include equipment and supply donations to schools, partnerships between UCSF volunteers and SFUSD teachers, the operation of a resource center, and the SEP Student Lesson Plan Contest. Specially funded projects include *City Science*, *The Women's Triad Project in Science Education* and summer research internships for teachers and high school students. SEP also supports SFUSD projects including *SF Base* and the newly adopted K-8 science and health curricula. SEP is made possible through funds from NSF, NIH, Howard Hughes Medical Institute, Genentech, Herbert W. Boyer, the UC Office of the President, the UCSF Chancellor, Merck Pharmaceutical, PG&E, and private donations.

Thoughts from a long-time judge...

by Zina Mirsky

Just recently, I was rummaging through my wardrobe, seeking items that could go to Goodwill. I came across three fantastic T-shirts, emblazoned with the SEP logo — proclaiming the owner a Lesson Plan Contest (LPC) Judge — and decided I couldn't possibly part with those! The memories of the good times I had as an LPC judge made them worth more than just their weight in cloth.

I invite you to join me sometime as a judge, to experience the very best that San Francisco's public schools have to offer. If you're like me, and get your only contact with public education from the daily news, you will benefit from seeing middle and high school students in creative and energetic action.

How many of you could successfully create and implement a scientific experiment for a classroom of grade school students? How many could keep the boisterous class under control? How many could evaluate the learning process of these youngsters?

The middle and high school "teachers" that work for months on preparing a science lesson plan to deliver to middle or grade school students do all of the above, and a lot more. These young people work together as teams to present information as diverse as dissecting a cow's eye to examining how vision works, from conducting circuitry experiments that explain electricity to creating test-tube examples of our digestive processes (coupled, of course, with the tasty treats that compel youngsters to think about digestion in the first place).

We judges have the delightful experience of seeing science and

teaching in action, plus being part of the enthusiasm that only teams of high or middle schoolers can generate! Our faith in public education is restored and our energy refreshed by the presentations created by these young people. Plus, we get a stylish T-shirt and some pizza as we discuss the hardest job of all: deciding which among the 20 middle school and 20 high school teams are the very best teams at teaching science.

So, come on out next year and be a Lesson Plan Contest judge!

Zina Mirsky, Associate Dean in

UCSF's School of Nursing, has been a middle school judge for the past five years.

How many of you could successfully create and implement a scientific experiment for a classroom of grade school students?

SEP Thanks the 1997 LPC Judges

Thanks go out to the many judges for their time and energy. Middle school contest judges: Ben Bonham, Patricia Caldera, Joanne Chan, Liesl Chatman, Mark Churchland, Jennifer Dockter, Lynn Dow, Tracy Boswell Fulton, Greta Gougoski, Brinda Govindan, Monique Hultner, Zina Mirsky, Jed Pitera, Patricia Quebada, Laleh Shayesteh, Mary Tesler, Patricia Tsao, Clarissa Waites, Eureka Wang, and Linda Zuckerman. High school contest judges: Nick Alesandro, Karen Chew, Margaret Clark, Christina Cuomo, Dennis Deen, John Flanagan, W.F. Ganong, Christina Hull, Martin Kirk, Karlene Lee-Tung, Beaker Prince, Heather Read, Jim Richards, Laura Romberg, Susan Smiga, Rebecca Smith, Catherine Takizawa, Jeff Vanderbilt, and Veronica Yank.

Horace Mann MS & Washington HS Take Top Honors in the 10th Annual Lesson Plan Contest

How would you like to stand up in front of a class of 5th graders and demonstrate the effect of air pressure changes on metal cans? Or instruct 3rd graders on their digestive systems using a food processor, a Burger King meal, a funnel, and rubber tubes? These are the kinds of lessons presented by over 120 middle and high school students during the SEP Science & Health Lesson Plan Contest this past April. This was the tenth year of the Contest, which was started in SEP's early days by UCSF Professor Stanton Glanz. The contest offers SFUSD students an opportunity to develop and teach science or health lessons to other students. Contest participants, winners, and teacher coaches were honored on May 6th at UCSF in a ceremony which included a lesson called "Gak Attack" prepared and presented by SEP staff (see Activity Page). The presentation of awards was as thrilling as ever; one excited 2nd place winner almost fainted!

Middle School Division

First Place: "Feeling Pressured?" by Liz Caffrey and Summer Shapiro, coached by Debbie Farkas, from Horace Mann MS. Second Place: "The 6 Senses" by Clara Porter and Katy Tang, coached by Annette Anzalone from Herbert Hoover MS; "Digestion" by Suzy Soloman-abai, Steven Cardwell and Andy Li, coached by Ronna Voorsanger from Roosevelt MS; and "Cow's Eye Dissection" by Tam Pham and Danielle Pizzi, coached by Debbie Farkas from Horace Mann MS. Third Place: "Around and Around It Goes" by George Zhu, Marc Lowe, Tai C. Tokeshi, and Edmund Tramall, coached by Lawrence Yee; "Polarized Slides" by Erin Male, Andrea Wu, Jessica Deb, and Jillian Ruppenstein coached by Gail E. Block; "The Green House Effect" by On Lee Lau and Erica Li, coached by Anna Marie Karsant, all from Presidio MS; and "Acids and Bases" by May Maekawa, Aya Matsushima, Amy Phuong, and Alipio Lockett, coached by Ronna Voorsanger from Roosevelt MS.

High School Division

First Place: "Center of Gravity" by Duc Thai Nguyen, Tony Kiet La and David Phan Luu, coached by Ellen Koivisto from George Washington HS. Second Place: "Investigating Magnetism" by Alex Chan, Yin Yuen, Christina Toy and Patrick Kessler, coached by Ruth Green from George Washington HS. Third Place: "Make Some Sense" by Pollyanna Owen Ma, Gary Leung, Danny Quang, Sahra Park and Jack Liu, coached by Paul Koski from George Washington HS; Third Place: "Water Cycle" by Frank Trang, Henry Yeung, Jonathan Chen, William Kong and Billy Chau, coached by Ruth Green from George Washington HS; "Are You Ready for Some Shake Rattle and Roll?" by Cynthia Wei Chen and Jennifer Chieh Chen, coached by Bill Milestone from Abraham Lincoln HS; "El Globo Volador (The Hovercraft)" by Veronica Castro, Susana Portillo, Sandra Ferreyra and Wendy Alvarez, coached by Curt Gabrielson from Downtown HS; and "Light and Color" by Ellen Huang, Christina Stuart, Alice Liu and Adam Lam, coached by Daryl Zapata from George Washington HS.

Students at Presidio Middle School exploring hot air during the 10th Annual Lesson Plan Contest.

Entry Highlights

Every year, when the written lesson plans are judged, the reviewers come across some delightful sections. Here are some excerpts:

"Each child will have a face on themselves when they come to school. We will use their own faces so they will be able to point to muscles in their faces and will always have them after the lesson."

"As they continue to dissect the hearts, we will check on them and watch to see if they're doing the job correctly. We think they will listen very well because when we worked on our heart dissection that is all we could think about. We weren't even thinking about lunch or playing."

"Before the materials are handed out we will spend a few minutes talking about safety. We don't want the kids to run around with the scissors or have them playing around with them. We will make sure that the students don't try and eat any of the raw squid."

Triad: How Far We've Come in 3 Short Years

Triad girls having fun in the field performing a test for diatomaceous earth (which sticks to your tongue) while studying elephant seals at Año Nuevo.

For the past three years, through the Women's Triad Project, hundreds of San Francisco middle school girls have learned to use hand and power tools, visited the elephant seal colonies at Año Nuevo, and explored dozens of new science activities in science clubs. Funded in 1994 by the National

Science Foundation as an Experimental Project for Women and Girls, Triad promotes gender equity in science education by partnering UCSF women scientists and women teachers from 12 SFUSD middle school for an academic year. Together they lead activity-based science clubs for girls and explore teaching strategies for improving gender equity in mixed-sex science classrooms. Triad's goals for all participants – scientists, teachers, and middle school girls – are to increase self-confidence, assertiveness, and commitment to science. Each club is sponsored by two scientists, one to two

teachers and range in size from 10 to 45 girls, with an average of 25.

In the fall of 1994, Triad began

working with four middle schools (Francisco, Giannini, King, and San Francisco Community). Four more schools (Aptos, Davis, Marina, and Presidio) joined Triad in 1995-96.

During this second year, Triad focused on collecting and sharing club activities, developing collaborations with the San Francisco Education Fund and Girls Inc, and successfully piloting Family Nights. The Family Nights are evenings for girls, their families, teachers, scientists, and project staff to come together at the school site for hands-on science and good food - a combination that has been a big hit. This year, Triad expanded to include four more schools (Burbank, Denman, Lawton, Mann). Though working effectively with a group this large (24 scientists, 20 teachers, and 300 girls)

Triad has delved into analyzing video footage of teachers in co-educational classes, focused on preparing scientists, and fostered greater planning and reflection within partnerships.

has been challenging, Triad has had a productive year. Participants have delved into analyzing video footage of teachers in co-educational classes, focused on preparing scientists, fostered greater planning and reflection within partnerships, brought in educational researchers from Stanford University and Girls Count, and given presentations at professional meetings of scientists and educators.

Outcomes

After three years of development, Triad clearly has made a difference in the lives of its participants. Preliminary results based on written surveys, focus groups, interviews, and observations conducted by independent program evaluator Julie Shattuck with assistance from Mary Haywood are presented below.

Girls

The model of fun hands-on science activities with interesting materials, a high adult-to-student ratio, and an all girl environment has been a powerful one. In written surveys, girls' responses were consistently positive, with 94% of the girls reporting that they felt welcome as a Triad club member. Triad may be especially effective with at-risk students: two schools had particularly high ratings, one with a high percentage of newcomer Asian girls and students with low socio-economic backgrounds and the other with a large percentage of African-American and Latina girls from low socio-economic backgrounds. In addition, some clubs show an unusually high level of interaction between students from different ethnic and academic ability groups.

All Triad participants feel that the all-girl environment is an important part of the club. One girl commented, "A lot of times we don't want to chance looking stupid in class, so we don't speak up. In the girls' club, we don't try to impress anyone." 86% of the girls say that the female scientists are a very important part of the club. A few girls made comments like, "I used to

think there were no women scientists.” After participating in Triad, 64% felt they could be a scientist if they wanted to.

As one girl said, “It [the club] makes me feel that science has a beautiful side.”

Teachers

Teachers report that Triad has revitalized their work by making them more aware of gender issues and new ways of teaching. Teachers noted a renewed focus on equity as well as a more consistent use of techniques already familiar to them. 82% said that Triad has enhanced their understanding of and ability to talk about equity issues. They also reported that Triad gave them new strategies including grouping students by gender, wait-time, alternating calling on girls and boys, and asking more higher-order, open-ended questions of girls.

In an environment of scarce resources, Triad also offers scientific expertise and fresh hands-on experiments. One teacher said she appreciated the luxury of getting input from three competent adults to prepare club

lessons. The result was a good hands-on activity that she could also adapt for use in her regular classroom.

Teachers said they gained new insights into the nature of science. In the words of one Triad teacher: “Being in Triad and working with female scientists has demystified a lot of the scientific world. I could actually imagine myself as a scientist and thus I feel motivated to encourage girls to become scientists. Furthermore, I feel more confident to teach science as well as discuss scientific research and scientific matters of concern to the public.”

Teachers view the clubs as a way to pique girls’ interest in science. One teacher said, “Our purpose is exploration; letting the girls get in and do science, talk about it at a high level and put their hands on literally everything – tools, tissues, and equipment. Then later when they get into the labs they will be able to stand on their own feet.”

Scientists

Scientists come to the program to mentor girls and gain teaching experi-

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ence, which involves developing a new suite of skills and problem-solving strategies. Over half of the scientists say that Triad has made them more confident and better prepared to handle group situations. Early indications are that participation in Triad is an asset as scientists pursue careers. Those who have left UCSF report that the training Triad provided was highly regarded by new employers and was instrumental in landing academic positions. They report having good teaching skills, confidence, and greater comfort with leadership in these new settings, which they attribute to Triad. A 3-year Triad veteran scientist put it this way: “Professionally, my teaching in Triad has made me more confident for working with my colleagues and will carry over into residency. Also, as I was interviewing for residency, people were very interested in Triad. I believe Triad has helped set me apart from my colleagues.”

What’s Next?

In collaboration with SFUSD and the San Francisco Education Fund, SEP has a proposal pending with NSF to develop Triad further that if funded, will implement mixed-sex models and perform extensive formal research on program impact. Notification is expected in November of 1997; keep your fingers crossed. In the meantime, SEP will prepare for the coming year with the caveat, “funding pending.”

Teachers & Scientists: If you would like to be a part of Triad for the 1997-98 academic year, please let Katherine Nielsen know of your interest. We will be recruiting new participants this summer. Katherine can be reached at (415) 502-6690 or kmn@itsa.ucsf.edu.

One of the goals of Triad is to promote leadership through teaching. Here, a Triad girl teaches a family member about anatomy at a Family Night.

SEP Partner Profile: Patricia Kudritzki

Arranging a time to sit down with Patricia Kudritzki, 6th grade teacher at Aptos Middle School, to discuss this article was a challenge. We exchanged phone calls for several weeks, trying to fit an interview in between classes, faculty meetings, parent conferences, and Triad club meetings before finally agreeing to talk one evening on the telephone. Patricia is active. In addition to her teaching and extra curricular activities, she is also the mother of five. Patricia has boundless stores of energy. In the words of UCSF scientist Kimberly Tanner, Patricia brings a “high intensity level to her work, and also strong dedication and vast enthusiasm.”

Patricia is also one of the few teachers who was rehired by Aptos after it was reconstituted last year. (A school is reconstituted in response to poor student performance; in doing so, all of the administrators and faculty are released and new ones hired.) As a veteran teacher, Patricia has taken on a leadership role in the school’s science programs through her involvement with SEP. For example, through Triad, Patricia co-sponsors a girls’ science club with teacher Jane Gerughty, Kimberly, and UCSF Neuroscience graduate student Erin Peckol. Aptos teachers are impressed with Triad and consider it the premier science enrichment program of the school. Patricia comments that through Triad, “Girls are becoming leaders, gaining presentation and communication skills through a variety of experiences such as Expanding Your Horizons, Triad Family Night, and the Science Olympiad.”

When Patricia started teaching science six years ago, she was turned-on to SEP by her colleague Jane, who was already involved in a scientist-teacher partnership with Kimberly. Four years ago Patricia applied for and received a MedTeach team, a group of first-year medical students who supported her teaching of the sixth grade human biology curriculum. She

Patricia Kudritzki examining DNA structure with 6th graders.

and her students loved MedTeach; she has since recommended that her colleagues apply, which they have done successfully. Patricia is also a frequent user of the Resource Center, has attended BrainLink workshops, and has coached students in the Lesson Plan Contest.

A year ago Patricia applied for and received one of two teacher SEP Summer Internship positions. She spent last summer in the lab of Michael Skinner in the Dept. of Reproductive Endocrinology investigating the development of the male reproductive system in mice.

After this unique experience she feels much more confident discussing science, especially research, with her students. Her resulting desire to increase her students’ exposure to research has motivated her to

adapt biotechnology labs for use with her sixth graders. After a pilot lab, she reports that her students were excited by the equipment and the techniques; she hopes to do more with the curriculum next year.

The last few years have been unstable at Aptos, and Patricia is thankful that SEP has continued to support the school with programs like MedTeach and Triad. “Programs like SEP (and its volunteers) are a positive

response to what’s happening in the public schools,” notes Patricia. “Kimberly and Erin are the best thing that happened to me in teaching. They bring unadulterated energy and their experience in the real world of science to the classroom.” Theirs is clearly a partnership that thrives. According to Erin, “Patricia takes the extra time to really understand, perhaps because of her non-traditional science background. In fact, her background in language arts helps her to translate difficult science concepts to kid language.”

True to the spirit of their commitment to Aptos students and faculty, Patricia, Jane, Erin, and Kimberly will not just close the doors behind them

“Patricia takes the extra time to really understand, perhaps because of her non-traditional science background.”

when school lets out in June. They plan to inventory and organize the school’s science supplies and, with support from Triad, the District’s Office of Curriculum Improvement and Professional Development, and Erin’s and Kimberly’s labs, they will prepare science material kits for Aptos teachers to use next year. Patricia looks forward to another exciting and rewarding (and hopefully smoother) year.

Activity Page: Gak Attack

What is Gak? Gak is a whacky substance that behaves oddly. Just how oddly is something you'll have to find out by making it at home with your favorite science pals or at school with your students. It's a great way to explore states of matter, polymers, chemical reactions, and more—and it doesn't use anything exotic. Go ahead—try it!

How to make Gak:

The following recipe will yield a blob of Gak about the size of a golf ball. Here's what you'll need:

- 1 tbs 20 Mule Team Borax (in detergent section of grocery store)
- 2 tbs Elmer's or other white glue (polyvinyl acetate)
- water
- food coloring (optional)
- disposable mixing cup and stirrer
- small plastic bag for storage

1. Make sodium borate solution by dissolving 1 tablespoon 20 Mule Team Borax powder in 1 cup warm water. Stir to dissolve. Set solution aside.
2. In a separate container, mix equal parts (2 tablespoons each) water and glue for a total of 1/4 cup. Stir well. (If you want, add a few drops of food coloring at this stage; otherwise the Gak will be white.)
3. Add 1 tablespoon sodium borate solution to the glue-and-water mixture.
4. Stir and let it sit in the cup a few minutes. It will start to act oddly at this point.
5. Take it out, play with it, and try some of the experiments suggested below!
6. Store in a clearly marked baggie or airtight container in the refrigerator or freezer.

Warning: Do not let Gak sit on fabric, vinyl or wood; it may damage them. Gak is not poisonous, but that doesn't mean a person should eat it! Do not pour any leftover liquid down the drain; you can dispose of it by pouring it into a ziplock bag, sealing it, and putting it in the trash.

What to do with Gak:

Experiment to see:

What kinds of shapes can you make with Gak? What kinds of shapes can't you make with Gak?

What happens to the Gak when you set it on a table for a minute?

What happens to the Gak if you hold it at one end and dangle it?

How far can you stretch Gak? What happens to Gak when you stretch it and let go?

Does Gak break?

Can you get bubbles inside the Gak?
Can you get bubbles out of Gak?

What happens when you fold and unfold Gak?

What happens to Gak when you put it in a clear cup?

Can you pour Gak?

Gak Questions

What is a liquid? In what ways is Gak like a liquid?

What is a solid? In what ways is Gak like a solid?

Is Gak a liquid or a solid? Why?

What else acts like Gak? What could you use Gak for?

The Science Behind Gak

Gak is so odd because of its molecular structure. Glue consists of long strands of molecules that are linked together like beads on a necklace. This is called a *polymer*. When you add sodium borate to the glue, two big things happen. First, the borax links the long strands of glue together, side by side. This process is called *cross-linking*. It creates a net-like structure, making Gak behave like a solid. In turn, the net-like structure traps the water in between the strands. It's the trapped water that makes Gak behave like a liquid. Thus, Gak acts like both a solid and a liquid.

Taking care of your Gak

Gak will last a long time if you keep it clean and prevent it from drying out. Wash your hands before you play with it, seal it in a plastic zip-lock bag when you're done playing with it, and keep the bag in the refrigerator. Make sure that your Gak bag is clearly labeled—especially when it is in the refrigerator. Any of the following labels will do nicely: "Not Food," "For External Use Only," or "Gak! Do Not Eat!"

There are many different versions of Gak; SEP staff adapted the above from Susan Floore's recipe. Susan teaches at Dr. Martin Luther King, Jr. Academic Middle School. The following UCSF scientists have also been seen playing with Gak: Patricia Caldera, Erin Lopez, and Karen Oogema.

Want Ads: Positions Available

Academic Coordinator III; Elementary Programs/City Science: full-time senior position within the SEP unit. Primary responsibilities: supporting scientists and teachers; collaborating with District staff in designing, implementing, and evaluating City Science; supporting SEP core programs; participating in the grant writing. Candidates should be familiar with both science and education professional communities. For a detailed position announcement, call Roberta at 476-0337. Deadline: June 5th.

Scientists-in Residence: Work with City Science Elementary Focus Schools for an academic year. Averages 20 hours per month. Stipended position. Contact Margaret at 476-0338.

Triad Scientists: Sponsor a Triad club at the middle school level. 20-30 hours per month for an academic year. Stipended positions (funding pending). Contact Katherine at 502-6690.

Margaret from p. 1

among them are her command of science, her superb editing ability and far-reaching vocabulary, and, above all, her wisdom. "Margaret is so accepting and open," commented Tracy Stevens recently. "She believes the best of people. And she continues to embrace new things; think of all she's taken up in recent years: education, the fiddle, computers – we'll definitely miss her computer expertise!" When asked about her retirement and what's next, Margaret replied with glee, "I can hardly wait to find out!"

We think it might be Margaret's love of fiddling (the week of fiddle school is required vacation) and the Grateful Dead that keep her young. "I wouldn't say that I'm a Deadhead – but," Margaret laughs, "I have written grants with the Dead's assistance." And then there was the time Margaret dressed up like a thistle for a costume party and had dyed her white hair violet. Well, the dye didn't wash out of her hair immediately and she had to pick up a pending NSF program officer from the airport the next day. She did

it with purple hair and great southern charm; we got the grant.

We asked Margaret to reflect on what she wanted to say as a final comment. Without pause, she turned to the work of science education reform. "This effort really needs to be sustained over the long haul; it's not within the span of any one SEP volunteer." And then she added dryly, "Kind of like science, isn't it?"

Margaret, you will be missed.

SEP Summer Hours

SEP staff members keep varying hours over the summer, and the SEP Resource Center is closed over the summer except by special arrangement. If you need to visit SEP or are having trouble contacting a specific staff member, please call SEP's administrative assistant, Roberta Heidt, at 476-0300 to set up an appointment in advance. Roberta works on a half-time basis and is available from 8:30 to noon.