Naked mole rats, pond life and pillbugs: Outreach Partnership pilots first lessons

Braving heat, an impending thunderstorm, and the usual forest insects, 15 teachers plunge buckets and nets into the depths of Salamander Pond. They will analyze the gallons of water samples in the classroom at Tyson Research Center, identify what lives in the pond and determine the general health of its ecosystem.

“What makes it interesting is knowing where to dip the net to get good stuff, having enough pans to separate the samples, and providing pictures so students can identify the organisms,” explains Phyllis Balcerzak, director of the Tyson Field Science Program.

Stephanie Shannon, teacher at Pattonville Heights Middle School, is enthusiastic about her outdoor experience. “The biggest thing for me is learning stuff I didn’t know. It’s really exciting taking this back to the students, and learning about the resources at Tyson and Litzinger Ecology Center.”

Balcerzak and Shannon are part of a group doing activities designed to combine the richness of the outdoors with classroom learning. This concept is at the core of the Outreach Partnership program, funded by the National Institutes of Health Science Education Partnership Award and directed by Science Outreach. Teams consisting of middle school educators, Outreach staff, WU faculty, and staff at the Zoo, Garden, and Science Center developed middle school curriculum on animal behavior, ecology and genetics. In July, the animal behavior and ecology groups conducted workshops with teachers who had agreed to pilot test the lessons in their classrooms and at the Zoo, Tyson or Litzinger.

Carol Stephenson, education programs supervisor for the Saint Louis Zoo, works with the animal behavior team. “It was such a diverse, valuable gathering of educators, who were able to give us excellent feedback on our curriculum pieces,” she says. “To be able to make the zoo accessible to young people in a way that has them doing science with animals is wonderful.”

The pilot testing is an essential piece, according to Victoria May, Science Outreach director, who works with both teams. “Because teachers are so creative and in tune with what their kids are doing, to have them in at the ground stages of development makes the units really teacher-friendly,” she explains.

Thanks to all the pilot testers and curriculum developers who have designed these outstanding units.

Animal behavior team
Pilot testers
Sr. Eileen Fuchs, Nerinx Hall
Patti Laird, Brentwood High School
Pamela Marks, Lemasters Elementary
Shanise Munson, Lewis and Clark Elementary
Connie Newman, Westchester Elementary
Cheryl Ochy, Lewis and Clark Elementary
Joycelyn Pugh, Moline Elementary
Ellen Reilly, Whiteside School
Leslie Smart, Keyser Elementary
Barb Swalina, North Glendale Elementary
Lynn Tripoli Young, Flynn Park Elementary

continued on page 4
More than 5,000 students in 22 area high schools to learn DNA science as part of Modern Genetics for All Students

With the same polymerase chain reaction process crime labs use, 15 high school biology teachers use a sequencer to find out who has a DNA fragment containing an ALU sequence, and who does not. “If someone wants to know if you have gene X, this is what they’ll do,” explains Gary Corbin, coordinator. He is teaching a graduate course that introduces teachers to Modern Genetics for All Students, a curriculum implementation program designed to teach DNA science to high school biology students. The teachers look at the results of the process under an ultraviolet light to determine that out of the group, only two have the ALU-containing fragment. “This is stuff kids will need to know as they get older and might go for genetic tests or be called to sit on juries,” says Corbin.

Larry Wegman, biology teacher at Crystal City High School, is enthusiastic about the hands-on materials and activities. “It’s a great opportunity for kids to see the actual procedures geneticists use,” he says. Wegman explains that the program fills a gap for both new and experienced teachers. “Younger teachers may have the knowledge, but don’t have the equipment in high schools,” he says. “Wash. U. is supplying more equipment, so it’s an opportunity for more students to be involved.”

The course kicked off the program for biology teachers new to Modern Genetics. They are:

**Crystal City**
Larry Wegman

**Hazelwood East**
Pat Kelly
James Reynolds
Dorothy Burford
Loran Franklin
Deann Meyers
Gwen Thomas

**Maplewood-Richmond Heights**
Charles McWilliams
Kathleen Dwyer

**Wellston**
Laura Mohr

**Whitfield School**
Colleen Pahde

**Sumner**
Marsha Blaine

**Roosevelt**
Stacey Schoeffel

Crystal City, Hazelwood East, Maplewood-Richmond Heights and Wellston are the first new schools to become Modern Genetics partners since 1999. Their participation is made possible by a grant from the Monsanto Fund. They join the 17 current Modern Genetics high schools in St. Louis, Washington and Pacific. In 2001-02, all 5,210 students taking biology in the 22 schools will learn concepts presented in Modern Genetics. Monsanto’s support will make it possible to offer free supplies to the new public schools for two years. It will also allow four more new schools to join the program in 2002-03. The previously involved 17 schools pay a fee for the service, covering the cost of raw materials, starting this fall.

Lynn Barth, director of corporate contributions for Monsanto, explains the company’s goals in supporting Modern Genetics. “Science literacy is a focus of our funding, and teachers are essential to that,” she says. Barth also credits the passion and dedication shown by Outreach staff and Sarah C.R. Elgin, professor of biology and founder of the program. “I admire the thoughtfulness in curriculum design and other elements that distinguish this project from other kinds of teacher training,” says Barth.

Corbin taught the summer course with assistance from two teachers who are experienced in using the curriculum: Karen Thompson from Jennings and Marty Walters from Webster Groves. WU faculty also contributed background information and news regarding their research in genetics. Faculty guest lecturers were Elgin; Michael Neff, assistant professor of biology; David Kirk, professor of biology; Mark Johnston, professor of genetics; and Martin Israel, professor of physics.

Greg Wieland (left), and Larry Wegman (right), mark petri dishes containing genetically-crossed strains of yeast.
FALL OUTREACH OPPORTUNITIES

BIOLOGY SPEAKER SERIES: Issues in Genetic Counseling, Oct. 23

Join Modern Genetics coordinator Gary Corbin and colleagues to learn about issues faced by families with genetic diseases. Rachel Slaugh, genetic counselor at Children’s Hospital, will speak on Tuesday, Oct. 23 at 4:30 p.m. The session will be held on the Washington University campus in Life Sciences 202. This meeting is also part of the follow-up series for Modern Genetics teachers. Call Corbin, (314) 935-8138, ext. 1, or e-mail corbin@biology.wustl.edu to register.

MIDDLE SCHOOL WORKSHOP: Outreach Partnership genetics pilot testing

Attention middle school teachers: we need your help in pilot testing the Outreach Partnership unit on genetics. This Show-Me standards-aligned curriculum has been developed by Gary Schoenberger, Gotsch Intermediate School; Brenda Tyndal, Nottingham Middle School; Laura Strumfels, Cindy Encarnacion, Fred Vasquez and Debbie Wudtke, all of the St. Louis Science Center; Gary Corbin, Modern Genetics coordinator; and David Kirk, professor of biology.

Teachers who participate in the workshop will become pilot testers, and will receive materials required to do the genetics unit with their students. They will also receive a free field trip to the St. Louis Science Center with their classes. Pilot testers are expected to teach the curriculum sometime during 2001-02. Those who wish to earn three graduate credits in education through Washington University may pay a $75 fee, attend three follow-up meetings, and do an action research report on the results of their pilot testing.

Dates: Friday, Sept. 28, 4-9 p.m.; Saturday, Sept. 29, 9 a.m.-5 p.m.; Saturday Oct. 13, 9 a.m.-5 p.m.

Location: St. Louis Science Center

Register: Call Amy O’Brien, administrative coordinator, (314) 935-6846, ext. 2, or e-mail obrien@biology2.wustl.edu. Or fill out the online registration form at www.nslc.wustl.edu/so.

SLPS partnership fall meetings

Middle school science teachers and high school biology teachers with the St. Louis Public Schools are again gearing up for work with Science Outreach. For 2001-02, topics will be more closely aligned to the teacher-designed curriculum and testing schedule. Mark your calendar for the first meeting dates:

SLPS high school biology meetings at Missouri Botanical Garden
Thursday, Sept. 20, 2:30-5:30 p.m.: Lab safety
Wednesday, Oct. 17, 2:30-5:30 p.m.: Teacher presentations
Thursday, Nov. 15, 2:30-5:30 p.m.: Human impact ecology

SLPS middle school science meetings at Gateway Middle School
Wednesday, Sept. 12, 3-5 p.m.: Planning and organization
Wednesday, Oct. 10, 3-5 p.m.: Lab safety
Wednesday, Nov. 14, 3-5 p.m.: Topic TBA

Meetings will not be held in December, but will resume in January 2002. Find dates and topics for the additional meetings, plus downloadable Acrobat PDF files of the teaching and testing schedules, at http://www.nslc.wustl.edu/so.

MARK YOUR CALENDAR:

Spring 2002 Hands-On Science K-8

- Edu 6002 Hands-On Science K-8: Heredity and Life Cycles (3 credits)
- Edu 6010 Hands-On Science K-8: Mathematics Concepts (3 credits)

For more information or to register for these classes, call Amy O’Brien, administrative coordinator, (314) 935-6846, ext. 2, or e-mail obrien@biology2.wustl.edu. Or visit us on the web at www.nslc.wustl.edu/so.
Do you want to bring your class to the wilderness for a true field experience? If so, you’re like more than 350 teachers and 11,000 students who visit Tyson Research Center each year. Tyson, Washington University’s biological field station, is the site for faculty research projects in ecology. The 2000-acre reserve features oak-hickory forest, streams and ponds, and a diversity of wildlife only 20 minutes from downtown. Since 1982, the Field Science Program has made these natural resources available to K-12 student groups and provided expert instruction and interpretation. In summer 2001, the Field Science Program joined forces with Science Outreach.

Jonathan Losos, professor of biology and director of Tyson, explains how the merger happened. “We’d started to reflect on where we were and where we were going,” he says. “Our goal in working with Outreach is to combine the strengths of each program. The Field Science Program has great opportunities for school kids and Science Outreach has great programs for teachers. It seems like a natural fit, like a whole that’s greater than its parts,” says Losos.

May recruited Phyllis Balcerzak, clinical associate in education, and an aquatic ecologist, to direct the Field Science program with Susan Ianke-Mueth, a Field Science instructor who has taken on the role of coordinator. Ianke-Mueth plus Joe Nydegger and Jane Walker are the Field Science instructors. They are assisted by about 10 volunteer instructors, many of whom have lent their expertise to the program for years.

“Sometimes this is the first wild experience kids have ever had. Some are overwhelmed. We try to take advantage of the little teaching moments they experience here,” says Ianke-Mueth, a former special education teacher. She looks forward to developing new programs with Balcerzak and the Field Science staff. “We want to expand our summer programs, perhaps do some scout camps or maybe a day camp. Phyllis and I were talking about doing more on urban wildlife; helping teachers take advantage of what’s available in the city. Jane and I would like to add a program exploring environmental issues like pollution,” she says.

Balcerzak, who works with in-service teachers in the master of arts in education program, is pleased to have an opportunity to combine her areas of expertise. “Tyson is a great resource in which to learn about both biology and ecology in the natural world,” she says.

Tyson Field Science Program staff: Phyllis Balcerzak, Jane Walker, Susan Ianke-Mueth, and Joe Nydegger

The Tyson Field Science Program welcomes visits from school and scout groups for hands-on ecology activities. Fees are dependent on group size and visit length. Topics are determined by the season. For more information or to schedule a visit, call Susan Ianke-Mueth, coordinator, (314) 935-8437, or e-mail simueth@biology.wustl.edu. You can also visit www.biology.wustl.edu/tyson/educ.html.

**Fall Field Science Topics**

The Tyson Field Science Program welcomes visits from school and scout groups for hands-on ecology activities. Fees are dependent on group size and visit length. Topics are determined by the season. For more information or to schedule a visit, call Susan Ianke-Mueth, coordinator, (314) 935-8437, or e-mail simueth@biology.wustl.edu. You can also visit www.biology.wustl.edu/tyson/educ.html.

**Grades K-12**
- Bats
- Discovering Nature through the Arts
- Forest Ecology
- Geology
- Insects and other Arthropods

**Grades 6-12**
- Non-Flowering Plants and Fungi

---

**Partnership cont’d from p. 1**

Curriculum developers
- Carol Stephenson, Saint Louis Zoo
- Terrilyn Clardy, Sumner High
- Janet Crews, Wydown Middle
- Stan Braude, lecturer in biology

Ecology team
- Pilot testers
  - Don Knobbe, Steger Sixth Grade Center
  - Stephanie Kreunen, Francis Howell
  - Pamela Marks, Lemasters Elementary
  - Shanise Munson, Lewis and Clark Elementary
  - Ellen Reilly, Whiteside School
  - Stephanie Shannon, Pattonville Heights Middle
  - Carol Sheehan, Hixson Junior High
  - Claudia Walt, Wydown Middle

Curriculum developers
- Celeste Prussia, Missouri Botanical Garden
- Michelle Dodds, Pattonville Heights Middle
- Maline Cole, Northwest Middle
- Mark Kalk, coordinator
Teaching Teams gear up for ‘01-02

What can elementary or middle school students learn from playing a game of acid-ball? How can kids learn how to do a good science fair project? Or discover what chemicals make the best fertilizers for plants?

Teaching Teams help area K-8 students explore answers to these questions and more. Pairs of WU undergraduates, most of whom are majors in biology or chemistry, visit classrooms to present hands-on enrichment activities through the Teaching Teams program. Teachers select a topic relevant to their curriculum, then work with the WU students to schedule the visit. Each Teaching Team activity consists of two one-hour sessions presented about a week apart.

Because of high demand, teachers are limited to two Teaching Team activities each academic year. The final list of topics is not yet established for this year, but it will be similar to previous years. For more information about Teaching Teams or to schedule a visit, call Elaine Alexander, coordinator, at (314) 935-7170 or e-mail elaine@biology.wustl.edu.

Outreach thanks faculty/staff partners

After a busy year, Science Outreach sends a heartfelt “thank you!” to all the faculty and instructors listed below who have given their time and expertise to our teacher education programs. We couldn’t do it without you!

Summer Scholars mentors
David Beebe
Kyunghee Choi
Nicholas Davidson
Aaron DiAntonio
Jeremy Gibson-Brown
Alison Goate
Paul Goodfellow
Danny Kohl
Linda Kurz
Petra Levin
Arthur Loewy
Robin Lorenz
Jeanne Netheranne
Andy Pekosz
Gavin Perry
Joel Price
Carl Romano
Patrick Sartor
Steven Weintraub

Summer Scholars mentors
Pet Gibbons
Jeremy Gibson-Brown
David Heyse
David Ho
David Kirk
Danny Kohl
Petra Levin
Ruth Lewis
Ralph Quatrano
Eric Richards
Barbara School
Sharon Stahl
Paul Stein
Frank Yin

Education 6000 instructors and guest lecturers
Phyllis Balcerzak
Randy Buckner
Roy Curtiss
Jack Diani
Sarah Elgin
Pet Gibbons
Ursula Goodenough
Erik Herzog

Outreach Partnership
Stan Braude
Phyllis Balcerzak
Susan Ilanke-Mueth
David Kirk, PI
Jane Walker

Prefrshmen
Ecology courses
Phyllis Balcerzak
Dick Coles
David Heyse
Barbara School
Judy Tisdale

Modern Genetics guest lecturers
Sarah Elgin
Martin Israel
Mark Johnston
David Kirk
Michael Neff
SCIENCE OUTREACH

Teacher Resources

### Project Aria

Project Aria is WU’s School of Engineering and Applied Science hands-on space engineering/science outreach program. To learn more about Project Aria, visit www.aria.seas.wustl.edu or email Keith Bennett, project director, (314) 935-6648, e-mail bennett@seas.wustl.edu.
- The Aria-3, a joint U.S./Australian project, is scheduled to fly on the Space Shuttle Endeavor in November. It will carry 22 experiments on the effects of space on Australian flora and fauna. Seven schools from the St. Louis area have been teamed with schools in Australia for the project.
- Project Aria is currently planning additional space shuttle experiments on future shuttle missions. Interested teachers should contact Bennett.

### Missouri Botanical Garden

MBG offers a range of courses and workshops in botany, biology, ecology, environmental issues, technology, math, and science education. For further information on teacher programs, please call (314) 577-5144 or visit www.mobot.org.

### Saint Louis Zoo

Classroom teachers and other educators can learn about and register for workshops by contacting the Zoo’s education department or visiting www.stlzoo.org. You can schedule a special workshop if you have a group of 12 or more teachers. Teacher workshops at your school site can be arranged for a nominal fee. For workshop information, contact Jim Jordan, associate curator of education, (314) 781-0900, ext. 340, or e-mail Jordan@stlzoo.org.

### Freebies

**compiled from NSTA Reports!**

- **Biology demonstrations** from Flinn Scientific, Inc. The latest BioFax! demonstrations and experiments available are “Lasting Impressions,” in which you make a stomata “leaf print” and hypothesize about the significance of stomata location and density; “Heredity and Environment,” in which you germinate albino tobacco seeds and examine the balance between heredity and environment; and “The Raw and the Cooked,” in which you chemically “cook” egg whites to illustrate denaturation of proteins and introduce the concept of protein structure. Contact Flinn Scientific, Inc., Free BioFax!, PO Box 219, Batavia, IL 60510; 1-800-452-1261; e-mail flimm@flinnsci.com.
- **Chemistry demonstrations** from Flinn Scientific, Inc. Request the three new ChemFax! demonstrations/experiments using the contact information given above. “Orange Juice to Strawberry Float” can help you introduce acids and bases to your students. In “Gold Rush,” you’ll turn a copper penny into “silver,” then “gold.” And “Chemical Cold Pack” will show you how to make your own cold pack with chemicals.

- **Aquademics Parent and Teacher Guide**, available online at www.tetra-fish.com/aquademics/index.html. The guide contains 40 hands-on, interactive lesson plans on tropical fish. Students can observe their behavior, solve word problems, depict the fish in stories and poems, and study historical events connected with the fish. The guide also shows how to set up and maintain a freshwater aquarium and gives information on marine science careers.

### Science education publications

from the National Institute of General Medical Sciences, available online at www.nigms.nih.gov/news/publist.html. New publications include:
- The Chemistry of Health
- “Medicines for You”
- Scientists for the 21st Century: Biomedical Research Training Opportunities for Minorities
- The Structure of Life
- Findings

“Challenge Young Minds–50 Ways to Better Education,” a pamphlet from the Education Excellence Partnership that offers simple ways educators, parents, employers, and community members can get involved in challenging students to learn more. See www.edex.org/FS3OurMS.htm, where you can read the pamphlet online or request a free copy.

**Understanding Our Weather Systems**, periodical with information, ideas for classroom discussions, and activities to help teachers plan and teach lessons on meteorology. Call the Weather Channel Education Department at 1-800-471-5544.

**Share the World**, an educational program designed to help children
TEACHER RESOURCES

individuals about outstanding K-12 science education resources available at WU and in the St. Louis area. Questions, ideas and contributions are welcome. Send items to Dana Benediktus. The newsletter is published three times yearly and mailed free. Contact Amy O’Brien or visit the website to join the mailing list.

Website: www.nsc.wustl.edu/scienceoutreach

Victoria L. May, Science Outreach director, may@biology.wustl.edu, (314) 935-6846, ext. 1

Elaine Alexander, Teaching Teams coordinator, elaine@biology.wustl.edu, (314) 935-7170

Phyllis Balcerzak, Tyson Field Science Program director, pbalcerz@artsci.wustl.edu, (314) 935-4539

Dana Benediktus, grants coordinator, dana@biology2.wustl.edu, (314) 935-4229

Gary Corbin, Modern Genetics coordinator, corbinbiology.wustl.edu, (314) 935-5348

Sarah C.R. Elgin, professor of biology, selginbiology.wustl.edu, (314) 935-8138, ext. 1

Susan Ianke-Mueth, Tyson Field Science Program coordinator, sianke@biology.wustl.edu, (314) 935-8437

Mark Kalk, program coordinator, kalk@biology.wustl.edu, (314) 935-8138, ext. 2

David Kirk, professor of biology, kirk@biology.wustl.edu, (314) 935-6812

Joe Nydegger, Tyson Field Science Program instructor, nydegger@biology.wustl.edu, (314) 935-8440

Amy O’Brien, administrative coordinator, obrien@biology2.wustl.edu, (314) 935-6846, ext. 2

Jane Walker, Tyson Field Science Program instructor, walker@biology.wustl.edu, (314) 935-8440

understand and appreciate animals, offers teacher’s guides, activity sheets, poster and video. Visit www.sharetheworld.com/.

“Cloning: Past, Present and the Exciting Future,” article that provides a historical overview of cloning and describes its scientific development. Contact Federation of American Societies for Experimental Biology, Office of Public Affairs, 9650 Rockville Pk., Bethesda, MD 20814-3998; (301) 571-0657.

“Six Quick Ways for Kids to Analyze Kids’ Books for Bias,” pamphlet published by fifth graders at the Memorial-Spaulding School near Boston. Teacher Mike Feldstein says the document “grew out of our recognizing the importance of looking critically at books read by children to make sure they do not promote stereotypes, sexism, racism, or other negative cultural concepts.” For a copy of this pamphlet, write to Feldstein at PO Box 61045, Newton Highlands, MA 02461-0345.

Pinhole camera and darkroom kit. Jim Kosinski, professor of photography at Hartwick College designed the camera and kit and has decided to give one away each week to teachers. To receive the camera and kit, send a brief description of your program and your school address to Jim Kosinski, Starlight Camera, PO Box 540, Cherry Valley, NY 13320; e-mail merlin@paintcancamera.com. For more details, visit www.paintcancamera.com, or call (607) 264-3480.

Grants

compiled from NSTA Reports!

The National Education Association will award more than 50 Learning & Leadership grants this year. The grants will fund professional development for public school teachers and support personnel.

Individual grants are $1,000; group grants are $3,000. For more information or an application, visit www.nfie.org/programs/leadership.htm, or write to The NEA Foundation, Learning & Leadership Grants, 1201 16th St. NW, Suite 416, Washington, DC 20036-3207. Applications must be postmarked by Oct. 15; NEA members will be given preference.

The National Gardening Association will award 100 grants for start-up youth gardens and 300 grants for established youth gardens. Each grant includes an award package of quality tools, seeds, plants and garden products. Programs involving at least 15 children between the ages of 3-18 are eligible; projects must reflect consideration for education, social, or environmental programming; innovative garden design; community support; strong leadership; and need and sustainability. To obtain an application form, visit www.kidsgardening.com; call 1-800-538-7476, ext. 205. The deadline is Nov. 1.

The Environmental Protection Agency’s Office of Environmental Education supports environmental education projects that enhance public awareness, knowledge, and skills to make informed decisions about environmental quality. The EPA’s current priorities are for projects that build state/local capacity to deliver programs; advance state/local education reform goals; educate the public through community-based organizations; educate teachers, health professionals, community leaders and the public about human health threats from pollution; improve teaching skills; promote careers; and educate low income or culturally diverse audiences. For more information, see www.epa.gov/enviroed/grants.html, call (202) 260-8619; or e-mail berger.diane@epa.gov.
Summer program investigates DNA science

Ashley Rhodes (right), checks the results of a genetic test with Iris Watson (left), both members of the Grace United Methodist Church Teen Action Group. The middle school students visited Washington University in July to learn about DNA and science careers with Outreach staff Elaine Alexander and Gary Corbin.