

# **A Compilation of the Bioscience Professional Development Opportunities Offered to K-12 Teachers in Iowa**

Jeremy Varner, Intern  
Iowa Department of Education  
Division of Community Colleges and Workforce Preparation  
jeremy.varner@iowa.gov  
ofc- 515/281.3640  
fax- 515/281.7528  
9/14/2005

**Notes:**

Professional development opportunities are offered piecemeal to K-12 teachers in Iowa through Area Education Agencies (AEAs), Regents' institutions, community colleges, private colleges, private corporations, and out-of-state institutions (often online). Compiling a comprehensive list of in-service and pre-service opportunities for primary and secondary public school educators is not feasible for a variety of reasons. However, this report briefly summarizes most of the bioscience-related options for professional development available for K-12 educators this summer and over the past year. The focus is primarily on bioscience/biotechnology workshops and summer institutes for middle and high school science teachers and inquiry-based science workshops for elementary school educators. Professional development opportunities from past years or in related fields (e.g. mathematics, writing) are not included. This report also does not attempt to quantify the number or percentage of teachers participating in science/bioscience workshops and institutes. At least as importantly, it also remains unclear how these professional development opportunities translate (or fail to translate) into the classroom. Sources for this report include: AEAs- individual AEA website's list of offerings, several AEA science consultants and some AEA professional development coordinators (at all but three of the institutions); Regents universities- individual institution websites, contact with some program coordinators and staff; community colleges- conversations with faculty, math/science department chairs, deans, or chief academic officers at most of the colleges; a recent survey of 1,000 public school teachers relating to biotechnology.

A graduate student at UNI is conducting a survey of biology, agriculture, and family/consumer sciences teachers related to biotechnology that is expected to be complete in September. While it is difficult to draw many conclusions thus far (only 46% have responded and only about half were science teachers), some preliminary results are worthy of being noted. First, of the 458 teachers (1,000 surveyed) responding, 70% reported insufficient knowledge of biotechnology as a barrier to incorporating it in the classroom. Only 51% of the teachers reported having any professional development experience with biotechnology. Of those that had such experiences, most reported having taken courses or short workshops through ISU. Approximately 72% of respondents reported that a lack of funding for professional development provided by the school district was a moderate or strong barrier to incorporating biotechnology education in the classroom (it was the second strongest barrier reported). The survey is expected to be complete by the end of the summer.

It appears that most science-related professional development opportunities available are for elementary school teachers (hands-on, inquiry-based methods). While it seems that a concerted effort to improve science education at the elementary level is in the works with the Department of Education's Every Child Inquires (ELI) initiative and AEA workshops, professional development opportunities for high school science teachers appear to be limited with the vast majority offered through the state's Regent universities. The AEAs do not appear to have the laboratory space or equipment necessary for these workshops. Partnerships with area community colleges may be a partial solution to this problem since many of these institutions have experience in biotechnology, well-trained faculty, laboratory space/equipment, and are accessible (both geographically and in terms of cost). However, even if professional development opportunities are offered to

teachers, there is no guarantee that they will translate into curriculum changes, especially for short two-day workshops. Several additional barriers may prevent implementation of new biotechnology curricula, including a lack of funding for classroom lab equipment. While ISU's BOEC attempts to resolve this issue by providing free equipment, nearly 76% of the teachers surveyed reported that a lack of funding for equipment was a moderate or significant barrier to incorporating biotechnology into their classrooms (this was the strongest barrier reported). Project SEMI appears to address this issue by essentially allowing districts to share expensive laboratory space and equipment on a rotating basis (very similar to how hospitals share imaging equipment although financed differently). However, Project SEMI is largely confined to Heartland AEA and anecdotal evidence suggests most secondary schools are using outdated science equipment (and training).

## **Regent University Offerings**

### **Iowa State University**

Several biotechnology-related professional development opportunities are offered to K-12 teachers through Iowa State University (ISU) outreach programs. The Biotechnology Outreach Education Center provides many 3-4 day workshops to teachers in a variety of fields and the Plant Genomics Outreach program offers an extensive seven-week program for a small number of biology teachers. Additionally, workshops on biotechnology education are offered through ISU Extension.

The Biotechnology Outreach Education Center (BOEC) in the Office of Biotechnology has offered professional development opportunities to teachers since 1988. Biotechnology outreach education coordinator Mike Zeller and bioethics outreach coordinator Kristen Hessler offer summer biotechnology education workshops that allow educators to update their biotechnology and bioethics teaching skills through 3-4 day programs. Workshops held this year include biotechnology education I for science educators; bioethics workshop I; biotechnology education I for agriculture and family and consumer sciences (FCS) educators; biotechnology II for science, FCS, and ag teachers; a workshop for elementary teachers through ISU's Toying with Technology program; and Research Experiences for Teachers, the National Science Foundation program directed by Adah Leshem-Ackerman discussed in detail below.

The center has two state-of-the-art laboratories with 40 lab stations, computers for bioinformatics, and a prep room dedicated solely for outreach year-round. During the school year, many teachers bring classes to the center for field trips, invite BOEC personnel for on-site visits, or order free supplies – more than 16,000 students from more than 150 schools participated in hands-on activities during the 2004-2005 academic year.

During the 2004-2005 school year, the BOEC reports that 117 pre-service teachers in agriculture education, biology, FCS, and elementary education received hands-on experience in the principles and techniques of biotechnology and how they might incorporate them in the classroom. Summer workshops began at ISU in 1988 and nearly 1,300 educators have since participated in at least two days of biotech training. Participating teachers are also eligible to receive free supplies and equipment for lab protocols. More than 123,000 Iowa students have benefited from free lab supplies and

materials. Funding for workshop materials and \$50/day stipends offered to teachers are provided by the ISU Office of Biotechnology and the Iowa Biotechnology Association.

In addition to summer workshops, BOEC also offers online bioethics courses that satisfy staff development requirements. Available courses include: teaching bioethics, ethics and biotechnology, and ethics and animals. Each course requires a minimum of 15 hours online plus an additional 15 hours of reading, writing, and research. Students participate from their homes using personal computers with Internet access. The courses teach educators to critically discuss and teach others about moral issues surrounding particular biotechnologies. The teachers participate in asynchronous discussions (posting messages to discussion lists) and create an activity report, lesson plans, or other educational activities.

The Plant Genomics Outreach program offers pre-service and in-service biology teachers (grades 7-12) research opportunities in molecular biology, biotechnology, and genomics. Funded by the National Science Foundation (NSF), the seven-week program allows teachers the opportunity to conduct research under the mentorship of a distinguished group of faculty. Teachers gain first hand experience in the design, methods and analysis of research in the selected fields. The teachers also build relationships with career scientists and other teachers that may translate into better classroom instruction.

The program starts with a three-day training session at the ISU Office of Biotechnology (in Ames) after which teachers move to research labs where they work for 30 hours per week for six and a half weeks under the guidance of university faculty members. The teachers connect their research to current learning theory and develop classroom materials. At the end of the program, the participants present their materials to the curriculum and instruction staff.

Plant Genomics Outreach Coordinator Dr. Adah Leshem-Ackerman said participating teachers leave with a clearer sense of how science is conducted in a laboratory setting. The teachers get an in-depth understanding of theory, lab techniques, and applications (which she said few learn while in teacher training). Through the program, teachers also update their curricula to better serve students and incorporate hands-on learning opportunities (in the areas of genetics, microbiology, and biotechnology) into their lesson plans.

Leshem-Ackerman said teachers have been using the experience to enhance classroom activities. After the end of the first academic year following the program, teachers are asked to submit a report on how the program has influenced their curriculum (together with lesson plans and experiments developed as a consequence of the internship). The reports and focus groups, held six months after the program is complete, have shown that teachers are incorporating what they have learned into their classes in a variety of ways.

ISU Extension's Science, Engineering and Technology (E-SET) program offers curriculum, educator workshops, student activities, and other resources for individuals interested in science and technology education for youth. Workshop topics have included biotechnology, bridge design, kitchen science, exploring the universe, rocketry, climate change, and more. The biotechnology workshop can be customized to include instruction in laboratory protocols, DNA extraction and fingerprinting, biotechnology basics, youth

biotech summer camps and biotech school enrichment programs. The workshops are a minimum of six hours in length and are provided to all K-12 educators.

This summer, four workshops titled “Implementing biotechnology across the grades” will be held at AEAs 2, 8, 12, and 14. The two-day E-SET workshops are open to grades 4-12 and the content varies based on the teachers attending. The workshop will include hands-on biotechnology activities and labs with an emphasis on biotechnology laboratory protocols and necessary preparation techniques for labs in DNA extraction and DNA fingerprinting.

## **University of Iowa**

The University of Iowa offers several professional development opportunities to educators at both the elementary and secondary levels. Some of these workshops show elementary teachers how to adapt inquiry-based science class teaching methods promoted by the National Science Foundation (NSF).

The “Teachers as Action Researchers” Project provided a vehicle for professional development to 79 teachers from 38 different school districts. The focus was implementing action research in the classroom. Through the professional development of teachers, the goal was to improve classroom practice and raise student achievement scores. About 48 of the participating teachers are served via the ICN. Science Education Professor Edward Pizzini coordinated the program.

Pizzini also leads the Science Narrowing Achievement Gap (SNAG) project which tracks students from high poverty, low socioeconomic backgrounds, and that are underachievers to determine the achievement gap between them and their peers. The project provides professional development opportunities to teachers to assist them in instructing these groups of students.

The Iowa Chautauqua Assisting with Reforms Project was first initiated in 1983 and consists of two-week summer workshops for K-9 teachers. This year, the program showed teachers how to adapt science class teaching methods promoted by the NSF (inquiry-based). The project aimed to foster collaboration between 36 teachers (primarily from Charles City and Cedar Falls) through web-based interactions. Partnering with AEA 267, the project also involved three-day short follow-up courses in the fall and spring for teachers to report on the use of modules and assessment results. Science Education Professor Robert Yager coordinated the program using a \$90,000 grant from the Iowa’s Teacher Quality State Grant Program.

A similar project called SMILE (Science and Mathematics Inquiry Learning Enhancement) was offered through the UI Science Education Center. Also funded by a \$90,000 grant from the Iowa’s Teacher Quality State Grant Program, the project was a collaboration involving science and mathematics faculty, Grant Wood AEA, and five eastern Iowa school districts. The goal was to increase science and math achievement of all grade 5-8 students who qualify for free and reduced price meals. The project was directed by John Dunkhase, coordinator of the Secondary Science Teacher Education Program in the College of Education at UI.

Each of the previous three projects was completed in June 2005, Usha Mallik of the University of Iowa reported. A new three-year project, called SMARTS (Science and Mathematics Avenues to Renewed Teachers and Students), recently started being offered to K-6 teachers to increase student achievement in science and mathematics. The project

Revised 9/14/2005

Iowa Department of Education  
Division of Community Colleges and  
Workforce Preparation  
515/281.3640

involves a professional development program consisting of intensive summer institutes, academic year lesson-study groups and seminars, and implementation assistance, Mallik reported. Funded by a grant from the federal Mathematics and Science Partnership Program, the project was created through the joint planning of the UI Science Education Center, UI Department of Mathematics, Grant Wood AEA, and six high-need local school districts.

Over the three-year period, 50 teachers will be trained in inquiry-based methods through the SMARTS effort. The project will provide 120 hours of continuous professional development to nine teams, each composed of four to six teachers, as well as principals from six school districts. SMARTS is coordinated by John Dunkhase and Walter Seaman.

Another project, which has yet to be named, will involve professional development in the areas of physical science and bioscience. The one-year project will involve 5-8 teachers and run throughout the academic year, project coordinator Usha Mallik reported. The pilot project is being offered in collaboration with Grant Wood AEA and local school districts.

## **University of Northern Iowa**

The University of Northern Iowa offers summer professional development opportunities for science teachers in the areas of molecular biology and biotechnology.

Participants in the three-credit molecular biology course experience conceptual models and hands-on learning of molecular cloning and DNA analysis. Computer-based tools are used to analyze and understand DNA genomes. Exercises that can be adapted for use in high school classrooms are also introduced.

The biotechnology course is a one-credit, five-day workshop providing teachers with knowledge of biotechnology principles and lab techniques. Teachers learn classroom activities in DNA extraction and quantification from various sources, DNA transformation, DNA fingerprinting, bioinformatics, market gene expression, DNA isolation, recombinant DNA techniques, DNA amplification, sequencing, genomics, bioethics, and more.

In addition to the two courses previously noted, upper level biology courses are offered as professional development opportunities at Lakeside Lab near Lake Okoboji.

## **Community College Offerings**

### **Indian Hills Community College**

Indian Hills Community College offers two-day programs on genetic engineering, fermentation, and ethanol production to science teachers. Program Coordinator Janet Paulson said the two-day, grant-funded programs are offered through a partnership with AEA 15. Participating teachers earn either one graduate credit from Morningside College or one re-licensure credit from AEA 15 for each workshop.

In the genetic engineering and fermentation program, participating educators genetically engineer a nontoxic strain of E. coli bacteria to produce a Green Florescent Protein (GFP). The modified E. coli is then fermented in large batches and through processes called cell lysis and hydrophobic interaction chromatography the GFP is

extracted and purified. GFP is a protein produced by a jellyfish that glows green under UV light. The gene responsible for GFP has been inserted into a plasmid (circular piece of DNA) that is readily taken up by the E. coli bacteria and incorporated into its own genetic makeup. Paulson noted this is similar to procedures and processes used throughout the biotech world to manufacture and purify proteins. Participants also work with IHCC's virtual fermenter (using the college's virtual reality system) and observe a demonstration of process control equipment.

IHCC also offers a two-day advanced fermentation program to teachers. Participating educators explore the industrial fermentation of a value-added agricultural product and explore the biological and economic aspects of fermentation. The program includes hands-on laboratory activities as well as lectures and computer-based activities.

A two-day workshop is held for agriculture and science teachers on ethanol production. The course includes a series of labs (including wet milling of corn, malting of corn, mashing, fermentation of alcohol, and aspects of distillation) and lectures. Participating teachers receive a kit with instruction materials.

## **Eastern Iowa Community College**

Eastern Iowa Community College has offered a number of biotech workshops for high school teachers in conjunction with Iowa State University in past years. However, in recent years, opportunities have been limited. The most recent workshops offered to high school teachers included a workshop for high school agriculture teachers on biotechnology research and a half-day workshop for high school chemistry teachers. Both workshops were offered through a partnership with Monsanto, EICC Chief Academic Officer Jeff Armstrong noted. EICC Biology Instructor Paul Mayes has been actively involved with workshops for high school science teachers offered by ISU during summer months in Ames. However, the details of these activities were not available because Mayes is out of the office for the summer.

EICC's Advanced Technology Environmental Education Center (ATEEC) also offers professional development opportunities to K-12 teachers. Each June, the ATEEC Fellows Institute provides K-12 and community college instructors the opportunity to study the latest information and research on current environmental issues. For the 2005 Institute, ATEEC invited 20 exceptional high school and community college science, math, and environmental technology teachers (from a national pool of applicants) to evaluate the social injustices and human health risks against the environmental benefits of recycling. The University of Northern Iowa hosted the week-long program which classroom and research activities appropriate for high school and college students. The Fellows were paid to provide their expertise and experience in curriculum development and program improvement projects for the National Science Foundation which funds ATEEC. Each year, new curricular materials are developed for the selected theme and are distributed nationally by ATEEC.

The Fellows Institute is currently the only professional development program provided by ATEEC to K-12 teachers, however, in past years other grant-funded programs and workshops have been offered. ATEEC's mission is to improve environmental technology education through curriculum development, professional development, and program improvement.

## **Kirkwood Community College**

Kirkwood Community College offered a workshop on biopharmaceuticals to educators this summer. The three-day workshop, offered in partnership with AgrowKnowledge, provides awareness of a method of using renewable resources to produce pharmaceuticals, the skill sets needed for a career in biopharming, and the potential impact new technologies will have on production agriculture. Educators can receive reimbursement for mileage, lodging, and meals up to \$300. The workshops are funded through a NSF grant and with support from Pioneer Hi-Bred International.

## **Des Moines Area Community College**

Des Moines Area Community College has also offered bioscience professional development opportunities to public school teachers. Biotechnology Program Chair Jane Bradley said the college offered a series of workshops to teachers in conjunction with Project SEMI. The single day, 3-4 hour workshops covered areas such as horizontal gel electrophoresis. DMAACC's industry partners Integrated DNA Technologies and Pioneer Hi-Bred have also hosted teacher workshops using their own curricula, she said.

## **North Iowa Area Community College**

North Iowa Area Community College has offered professional development opportunities to elementary school teachers in the areas of math and science. The college recently participated in an NSF-funded project to strengthen math and science teacher preparation. During the 2005-2006 academic year, NIACC math and science faculty will pilot a learning community program that combines math and science instruction for elementary school teachers.

## **Western Iowa Technical Community College**

Western Iowa Technical Community College does not offer any science-related professional development, WITCC Chemistry Instructor Dr. Renee Romig said. However, she noted that if funding were available, the science department would be interested in providing professional development to high school science teachers.

## **Northwest Iowa Community College**

Northwest Iowa Community College partnered with AEA 10 this year to provide professional development opportunities to middle school math and science teachers. The grant-funded workshops, however, are not bioscience-related, NCC Dean of Arts and Science/Business/Health Dr. Rhonda Pennings reported.

## **Other community colleges**

The remaining community colleges either reported that they do not offer professional development opportunities to K-12 teachers in the area of science or they did not respond to the survey.



## **Area Education Agency Offerings**

Much of the K-12 professional development activity occurs through Area Education Agencies (AEAs). Many of the activities offered this summer are in the areas of inquiry-based science for elementary school educators though a couple workshops and institutes appear to deal directly with biotechnology. Virtually all of the workshops meet educators' license renewal credit requirements.

### **Keystone AEA 1**

No offerings related to bioscience or inquiry-based teaching methods were available during the past year, AEA 1 Science Consultant Peg Christensen reported. Christensen said her agency refers teachers to the biotechnology workshops offered by ISU.

### **AEA 267**

Area Education Agency 267 has offered a variety of professional development opportunities to educators in the area of science. Area 267 Science Consultant Darrin Strike reported that two-day, inquiry-based science workshops were offered twice over the past year in all three of the AEA's regions. More than 110 teachers were trained through this initiative, Strike said.

The most recent workshop trained teachers to use Full Option Science System (FOSS) kits in the classroom. FOSS-based K-8 science programs engage students in inquiry – they construct an understanding of science concepts through their own investigation and analyses, using laboratory equipment, student readings, and interactive technology. The program integrates reading, writing, and mathematics with students exercising logical thinking and decision-making skills appropriate to their age level. Level II, two-day FOSS workshops will be held this fall. Strike said he expects inquiry-based science workshops for elementary school teachers to continue next year.

In addition to the FOSS workshops, a two-day workshop for science teachers on Palm Imagiworks and Vernier Datalogger software was completed in June. Strike said the class and software helps teachers use data collection and analysis in the classroom.

AEA 267 has also created networking opportunities for teachers in the north and south regions of the agency. A four-hour science-oriented networking session introduced teachers to the state teacher of the year as well as representatives from the Department of Education. The session was followed by breakout sessions allowing teachers to get detailed information on items they were interested in. Other networking opportunities have been set for the fall of 2005 and the following spring.

In the northern region of AEA 267, a group of teachers has been participating in the Iowa Chautauqua Assisting with Reforms Project at the University of Iowa. Recently, the group attended an "inquiry network" where they shared inquiry-based teaching strategies as part of the program's follow-up. See the University of Iowa section for more details.

In partnership with ISU Extension, a two-day workshop on implementing biotechnology in the classroom will be held this summer. See the Iowa State University section (above) for more details.

AEA 267 also partners with Morningside College and Drake University to offer graduate credit opportunities. However, none of the courses recently offered appear to be related to elementary or secondary science instruction.

#### **AEA 4**

AEA 4 has offered inquiry-based science workshops to elementary school teachers, however, no biotechnology-related workshops have been offered for high school science teachers.

AEA 4 Science Curriculum Consultant Brian Nelson said biotech workshops had been offered to high school science teachers in conjunction with ISU but not within the last nine years. During the 2004-2005 academic year, AEA 4 partnered with NCC to provide a series of middle school level workshops on science, mathematics, and integrating technology, Nelson said.

This summer, two inquiry-based science professional development opportunities were offered to K-12 instructors. In June, AEA 4 partnered with Western Hills AEA to offer a three-day conference with presentations and breakout sessions targeting elementary, middle, and high school teachers. Topics included using FOSS and other kits to provide inquiry-based activities and experiences. In July, a two-day workshop was offered focusing solely on the implementation of FOSS kits in the classroom.

#### **Prairie Lakes AEA 8**

Area Education Agency 8 (Prairie Lakes) has not offered any professional development opportunities to K-12 instructors in science fields (including inquiry-based science workshops) during the past year, Dr. Leslie Moore reported. However, in partnership with ISU Extension, a two-day workshop on implementing biotechnology in the classroom will be held this summer. See the Iowa State University section for more details.

#### **Mississippi Bend AEA 9**

Area Education Agency 9 (Mississippi Bend) is offering several professional development opportunities in the area of science for educators. Two of the courses are offered online through a partnership with Drake University and all of the summer activities involve inquiry-based science teaching methods promoted by the National Science Foundation.

The first is titled “Hands-on/Minds-on Science in the Elementary Classroom.” In this course, teachers learn various ways to introduce and teach grade appropriate science concepts (incorporating National Science Teacher Association standards). The class is offered online in conjunction with Drake’s LessonLab programs (LessonLab is a Pearson Education company). A similar online course is being offered to middle school teachers, providing them with active and problem-based learning strategies to engage all of their students in science learning. Both online courses are 12 weeks in length and are available for both re-licensure and graduate credit from Drake.

Mississippi Bend also offers a course titled “Inquiry Science Learning 2005” which examines the rationales for inquiry-based teaching and learning cited in National Science Education Standards and research literature. Inquiry learning is modeled by

having participants experience scientific investigations of common phenomena. The workshop makes connections between inquiry-based learning and scientific literacy.

A fourth workshop for elementary school teachers explores a series of classroom activities inspired by the American Chemical Society and developed by chemistry and science education faculty at St. Ambrose University. The chemistry-related activities involve the hands-on learning of the physical properties of liquids (e.g. buoyancy, density), experimenting with polymers, and electrochemistry (e.g. building batteries made of fruit and nails). Participating teachers receive kits enabling them to perform the activities with their classes and prepare an activity to present to other teachers.

Mississippi Bend also offers a two-day workshop in the using of the Atlas of Science Literacy, developed by the National Science Teachers' Association (NSTA), to design science lessons. In the workshop, teachers develop an inquiry lesson and assessment instrument that is peer-reviewed and revised before being presented to other workshop participants.

AEA 9 Head of Staff Development Georgianna Koenig reported that Mississippi Bend has offered a one-credit, two-day workshop last fall titled "Using Kits as a Tool to Teach Inquiry-Based Science." Teachers worked in teams to learn simple effective techniques for creating lab notebooks and using the FOSS kits in the classroom.

Koenig noted AEA 9 partners only with Drake University to offer professional development to K-12 educators and does not offer opportunities through EICC.

## **Grant Wood AEA 10**

Area Education Agency 10 (Grant Wood) has provided a number of inquiry-based science in-service opportunities to teachers, however, few opportunities have been available to high school science instructors. Professional development workshops for high school science educators have been offered through ISU (electrophoresis kits have been provided to several area science teachers), however, all have been located in Ames, AEA 10 Science Curriculum Consultant Bruce Frana reported.

For elementary school teachers, the Van Allen Science Teaching Center (VAST Center) at AEA 10 provides leadership and support for exemplary science learning environments in area classrooms. In addition to creating curricula, classroom materials, and assessment strategies, the center provides professional development opportunities for teachers and administrators. A number of science kit workshops are among the opportunities.

Grant Wood AEA also offers a Science Inquiry Institute -- a 2-4 year collaborative learning program focused on implementing inquiry in the science classroom. Districts send K-12 teacher teams or individual teachers to learning sessions held throughout the year to study the inquiry research base, learn about inquiry-based instruction, and implement the strategy in the classroom. AEA science curriculum consultants conduct the institute and provide ongoing technical assistance and support to participating teachers. Currently, 13 districts are participating in the program.

## **Heartland AEA 11**

Area Education Agency 11 (Heartland) partners with the Iowa State University Biotechnology Outreach Education Center (ISU BOEC) to provide workshops and other

professional development opportunities (see the section about ISU for details). Additionally, AEA 11 is offering an inquiry-based science workshop for middle school teachers. The two-day program explains how teachers can implement FOSS (an NSF funded science curriculum). Teachers will also learn how to integrate technology into their science classrooms and to teach using an inquiry-based approach. A variety of FOSS kits are available (e.g. planetary science, electronics, force and motion), but the program will likely focus on life science and physical science modules. Participating teachers develop materials they can use in the classroom.

A second workshop offered by Heartland focuses on helping K-6 educators meet science and literacy goals through the use of FOSS kits. Participants will learn how to integrate the hands-on/minds-on science kits (which connect math, literature, and other areas) into their curricula. Teachers are given the option of selecting from a range of FOSS kits and manuals.

Heartland AEA Science Curriculum Consultant John Stiles reported that the only other bioscience professional development opportunity offered during the past year has been in conjunction with Project SEMI. The AEA has spearheaded the industry-supported SEMI project, offering three workshops for lead teachers in the program (DMACC has also provided workshops through their partnership). The lead teachers will act as mentors for other teachers next academic year. The SEMI lab will travel to high schools (primarily in AEA 11) during the academic year spending roughly one week at each school.

### **Western Hills AEA 12**

Area Education Agency 12 (Western Hills) partners with AEA 4 to provide professional development opportunities to educators within their area, however, no science-related offerings were listed on their website for this summer.

In partnership with ISU Extension, a two-day workshop on implementing biotechnology in the classroom will be held this summer. See the Iowa State University section (above) for more details.

Unable to reach science consultant.

### **Loess Hills AEA 13**

Area Education Agency 13 (Loess Hills) is offering a summer course on using scientific inquiry in the elementary classroom. The two-day workshop introduces teachers to the process of implementing inquiry-based instruction and assessment into their existing science program. Graduate credit for the course is available through a partnership with Drake University.

AEA 13 has also partnered with ISU to provide professional development to two specific districts, Science Consultant Kim Wise noted. The Science Writing Heuristic program is an inquiry-based approach with strong literacy connections. Teachers spend two weeks during the summer and three days during the school year working with the program. Wise said teachers are expected to do full implementation with ongoing support from the AEA (a consultant visits the district a couple of times each month). However, because of grant requirements, the SWH program is not open to all teachers.

## **Green Valley AEA 14**

No related offerings were listed for the summer. However, AEA 14 Technology/Science Curriculum Consultant Dave Blair reported that workshops and courses have been offered in the past. Blair has created a series of classes (three graduate credit hours) for upper elementary and middle school teachers involving hands-on, inquiry based science, however, there has been little interest in it thus far.<sup>1</sup>

During the summer of 2004, some hands-on, inquiry-based activities were held. A few years before, AEA 14 partnered with ISU and SWCC (utilizing their laboratory space since AEA's generally do not have such facilities) to offer biotechnology-related workshops.

In partnership with ISU Extension, a two-day workshop on implementing biotechnology in the classroom will be held this summer. See the Iowa State University section for more details.

## **Southern Prairie AEA 15**

Area Education Agency 15 (Southern Prairie) has partnered with Indian Hills Community College to offer three courses in genetic engineering, ethanol production, and fermentation to educators (see the section about IHCC for details), AEA 15 Professional Development Coordinator Karen Brown reported.

## **Great River AEA 16**

No related offerings were available during the past year, AEA 16 Science Consultant Kathy Mainz reported.

## **Private Colleges and Universities**

### **Drake University**

Drake University offers a number of workshops and other professional development opportunities through its Distance Learning Program (Skylight). The university partners with several AEAs to make the courses available statewide. In past years, biotechnology courses have been offered. However, none of the courses currently offered appear to be bioscience-related.

### **Other Private Colleges**

Other private higher education institutions such as Morningside and Dordt also partner with AEAs to offer professional development opportunities to K-12 teachers (often allowing teachers to receive graduate credit). However, few appear to be in science areas. In this report, programs offered by private colleges through AEAs are listed under the AEAs that offer them.

---

<sup>1</sup>Blair noted that many elementary teachers have lacked the time to take science-related courses given the heavy load of reading and mathematics (associated with NCLB). However, he expects science education to enter the spotlight within the next year or so as the Iowa Department of Education's Every Learner Inquires (ELI) initiative moves forward. The emphasis is likely to be on elementary science instruction, he noted, with fewer opportunities for professional development of high school science teachers available outside of graduate courses at four-year universities.

## **Out-of-state institutions**

Several out-of-state institutions of higher education offer online opportunities for Iowa's K-12 teachers to meet professional development requirements. Sometimes these courses are offered through partnerships with AEAs (e.g. AEA 15 partners with Northwest Missouri State University).