

**MINNESOTA OFFICE OF HIGHER EDUCATION
IMPROVING TEACHER QUALITY PROGRAM GRANTS
TITLE II, PART A, NO CHILD LEFT BEHIND ACT OF 2001
MARCH 2015**

Project Description

Grant Amount

I. In-service Projects for Teachers in Science

Biotechnology/Microbiology for Teachers in the Classroom (BioTIC IV)

\$47,583

Hamline University

Lee Schmitt

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lschmitt@hamline.edu

This project will provide a rigorous ten-day institute for 14 life science/biology teachers. The institute will support the design and implementation of classroom biotechnology units/investigations with shared unit plans, peer review, and classroom support. Participants will be able to demonstrate a growing understanding of basic theoretical and applied principles of biotechnology through projects, presentations, and curriculum integration. Participants will introduce into their curriculum additional biotech investigations reflective of cutting-edge research and applications. In addition, participants will implement additional classroom best practices that include new experimental protocols and student-directed investigations. Participants will receive four graduate credits with successful program completion.

Science Assets Teacher Academy: Science Learning from the Works of Scientists

\$49,639

The Bakken Museum

Dr. Beth Murphy

612-926-3878, ext. 205

murphy@thebakken.org

Through a summer institute and school-year follow up, 12 science, social studies, and ELL teachers will develop a deeper understanding of relevant standards from science and English language arts and their relationship to each other. In addition, participants will increase their instructional practice through high-quality, rigorous lessons focused on reading in science. A third objective is to increase participants' science assets which include teaching confidence, perceived relevance of standards and related practices, and skills to student's lives; participating in a community of peers to improve instructional practice and student learning; and willingness to take risks and learn from mistakes to grow professionally. Participants will receive four graduate credits with successful program completion.

Schoolyard Ecology and Explorations**\$119,811****University of Minnesota****Dr. Robert B. Blair and Dr. Karen Oberhauser****612-624-2198 (Dr. Blair); 612-624-8706 (Dr. Oberhauser)****blairrb@umn.edu; oberh001@umn.edu**

This program will provide 30 elementary and middle school teachers with a basic background in field ecology and allow teachers to conduct science in ways that reflect processes and practices of science used by scientists and to institute these practices in their classroom teaching. The program is closely tied to the K-12 Science Education Framework (NRC 2012), the Next Generation Science Standards (NGSS 2013), and the Minnesota Academic Standards in Science. Participants will learn field ecology, learn how to conduct ecological research in schoolyard gardens with their students, integrate technology in these practices, and become part of science education partnerships between educators and researchers. The course will consist of nine summer days spread over two separate weeks and two Saturdays during the school year. During the summer session's two-week break, participants will conduct inquiry experiments using a schoolyard as a study site. At the follow-up meetings, teachers will report on and interpret their students' inquiry data and discuss ways in which they are engaging as leaders to bring this content to their colleagues. Participants will receive three graduate credits with successful program completion.

Investigative Plant Biology for Elementary Teachers**\$51,909****University of Minnesota****Dr. Susan M. Wick****612-625-4718****swick@umn.edu**

This project will provide 18 teachers with a nine-day intensive summer workshop on plant biology with three follow-up school year meetings. Through an intensive hands-on summer session, teachers will receive basic background in plant biology and experience inquiry-based learning with the support necessary to incorporate inquiry lessons in the curriculum. Classroom assessment of participants will determine usage of program content and skills in stimulating inquiry among students. Participants will receive three graduate credits upon completion.

Renewable Energy and Bioproducts**\$50,930****University of Minnesota****Dr. Ulrike W. Tschirner****612-624-8798****ulrike@umn.edu**

With a nine-day summer session, three half-day school-year group meetings, visits to classrooms, and varied methods of contact, 20 middle and high school teachers will develop a "hands-on" approach to introducing fundamentals of chemistry, physics, and engineering to students. Environmental awareness will be raised as some of the newest developments in the area of renewable energy will be addressed. In addition, discussion will focus on the importance of renewable products in society and address environmental issues and sustainable utilization of natural resources. Concepts of engineering, in the context of renewable energy, will be introduced as required by strand one of the Minnesota Science Standards. The follow-up meetings will feature technical presentations by invited speakers and discussions on classroom practices and student assessment. Participants will receive three graduate credits upon completion.

**Investigating Environment to Understand Concepts of Science in Grades K-8,
Composting: Building a Laboratory Worm Home** **\$58,142**
University of Minnesota
Pauline Nickel
507-752-5068
nicke002@umn.edu

The 2015 project will build on the 2011 theme “Sun Dials in the Garden: Physical and Biological Exploration of the Environment.” Project content will focus on hands-on activities for “experiential learning” and provide context for delivering science concepts which address the Minnesota Science Standards and allow modeling of Best Teaching Practices. The lessons, the science, and the standards addressed provide the context for illustrating rubrics and strategies for gathering quantitative and qualitative evidence of student learning and building examples of grade level appropriate rubrics useful for classroom teaching and assessment. Participants will receive three graduate credits upon completion.

Teaching Inquiry-based Minnesota Earth Science (TIMES XIV.5) **\$45,481**
Hamline University
Lee Schmitt
651-523-2562
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Through a rigorous four-day summer field-based institute and four follow-up Professional Learning Community sessions, 14 earth science teachers will have hands on practice in earth science field research protocols and an experiential overview of Minnesota geology within the context of investigating the rocks, rivers, fossils, landforms, and soils of northwestern Minnesota. Instruction in inquiry strategies for the classroom will be modeled, and participants will have the time and peer support to design field research activities for content areas of their curricula that meet the inquiry/field study component of the Minnesota Science Standards. Participants will receive four graduate credits with successful program completion.

Inquiry-based Physical Science for Secondary School Teachers **\$49,414**
University of Minnesota
Dr. Gillian Roehrig
612-625-0561
roehr013@umn.edu

During a one-week summer course, 20 physical science teachers will participate in activities using quality professional development designed to improve the learning of students by organizing teachers into learning communities whose goals are aligned with those of the school and district. Following the standards for professional development (NSDC, 1995), this project will promote the development of new instructional skills and deeper conceptual knowledge and provide training combined with coaching through scheduled follow-up observations to provide formative feedback on chemistry instruction during the academic year. Participants will receive three graduate credits upon project completion.

II. In-service Projects for Teachers in Mathematics

Arithmetic Foundations I

\$40,286

Bemidji State University

Dr. Heidi B. Hansen

218-755-2820

hhansen@bemidjistate.edu

The Arithmetic Foundations I program will provide professional development to improve teacher effectiveness for 32 elementary and middle school teachers and highly qualified paraprofessionals from northern and central Minnesota. The project will provide content instruction using mathematical models to enhance participants' understanding of the foundations of arithmetic, instructional models to increase participants' motivation to teach effectively, and provide participants with improving student learning. Follow-up meetings will be held during the academic year. Participants will receive three graduate or undergraduate credits upon completion of the program.

Arithmetic Foundations II: Mathematics Instruction to Reach All Students

\$41,520

Bemidji State University

Dr. Heidi B. Hansen

218-755-2820

hhansen@bemidjistate.edu

The Arithmetic Foundations II program will provide professional development to improve teacher effectiveness for 35 elementary and middle school teachers and highly qualified paraprofessionals who have completed Arithmetic Foundations I. The program will expand the participants' knowledge of problem solving and of the foundations of arithmetic. Teachers and paraprofessionals forming a core group will work together to improve mathematics and instruction for their diverse classrooms. Follow-up meetings during the school year will focus on the instructional practices that were molded during the Arithmetic Foundations II class. Participants will receive three graduate or undergraduate credits upon completion of the program.

Core Concepts of Calculus

\$50,766

Macalester College

Dr. Tom Halverson

651-696-6466

halverson@macalester.edu

Thirty middle and high school mathematics teachers who have participated in previous Improving Teacher Quality institutes will participate in a ten-day program that focuses on calculus. The objectives of the program are to have participants revisit the key ideas of calculus and the integration of these ideas throughout the secondary and middle school mathematics curriculum and to explore ways that calculus is evolving in the new millennium to meet the needs of students in the social and biological sciences and to take advantage of the rapidly changing technological landscape. Each class begins with a problem related to the topic of the day to allow participants to work in groups to sharpen and expand their problem-solving skills. Interactive lectures, group work, modeling of real-world application of the day's topic, and use of technology to solve problems will enhance the understanding and teaching of the topic of the day.

e³Algebra: Engineering Engaging Eighth Grade Algebra
University of Minnesota
Dr. Lesa Covington Clarkson
612-626-9243
covin005@umn.edu

\$73,366

To increase student achievement in the algebra strand on the 5th-9th grade MCA-III, 28 teachers from north Minneapolis and St. Paul will participate in two weeks of summer professional development with academic year follow up. Project objectives are to prepare teachers to engage students in algebra through innovative teaching methods, increase teacher content knowledge of algebra and its connection to higher mathematics, to support implementation of Minnesota Mathematics Standards, and to develop blended “learner target” lessons. The content and pedagogy of the professional development and the iPad mini lessons for students will transform classroom teaching and student learning.

Improving Student Outcomes thru Differentiating Instruction in Number and Operations (Grades 1-5)
Minnesota State University, Mankato
Dr. Teri Wallace
507-389-5381
teresa.wallace@mnsu.edu

\$59,459

Twenty elementary teachers from southern Minnesota will participate in a one-week summer workshop and academic year face-to-face learning and online community learning to increase their mathematical content knowledge and application of authentic data to address multiple Minnesota math content standards within the number and operation strand. Focus will be placed on increasing teacher capability to differentiate math instruction with authentic data and problems, increasing teacher ability to apply differentiated strategies to mathematics content and inquiry-based instruction, and increasing teacher ability to use student work to assess student performance and inform instructional decision making.

III. In-service Projects for Teachers in Social Studies

Geography & Geotechnology in the Social Studies Classroom and Advanced Geography & Geotechnology in the Social Studies Classroom
Macalester College
Dr. David A. Lanegran
651-696-6504
lanegran@macalester.edu

\$51,977

To improve the quality of teachers as leaders, 40 teachers will participate in a professional development program in geography content, authentic pedagogy, integration of the common core language requirements into geography lessons, and application of geo-spatial computer technology into the curriculum. To accomplish the objective of enabling middle and high school teachers to implement the Minnesota State Graduation Standards for Geography, participants will be engaged in action-based learning activities including seminars, lectures, discussions, tutorials, and computer lab sessions. Participants will receive two graduate credits upon program completion.

Using Paideia Seminars in History, Civics, and Geography

\$41,281

Augsburg College

Dr. Anne Kaufman

952-475-0101

kaufman@augsborg.edu

This year-long project for 20 5th-12th grade social studies teachers is designed to ensure that content knowledge is infused into effective instructional practices by integrating the Minnesota Academic Standards in Social Studies with an authentic pedagogy known as Paideia seminars and to foster teacher leadership among previous participants in the areas of mentoring new Paideia practitioners, training colleagues, and assessing student learning. Teachers will participate in a summer institute to learn a variety of seminar formats and will write curriculum combining an appropriate selection of social studies content with inquiry strategies. During the school year, on-site consultations, one classroom observation, and five follow-up training workshops will be conducted to supplement and reinforce content, pedagogy, and teacher collaboration. Participants will be provided internet access to the Augsburg College Moodle or Google site that will facilitate a discussion board, web links, and repository for seminar lessons. Participants will receive four graduate credits upon program completion.

Economics for the Elementary Grades 2015-16

\$47,149

Minnesota Council on Economic Education

Dr. Donald Liu

612-625-6765

dliu@umn.edu

A year-long course on basic economic principles and their relationship to state academic standards for economics with instruction in a variety of pedagogical techniques will be provided for 25 K-6 teachers. The course will consist of an intensive week-long seminar with demonstrations of learning activities designed to integrate basic economic principles into elementary core curricula (reading, mathematics); two follow-up participant meetings to monitor implementation; and individualized group support for the development and implementation of learning activities, student projects, and assessment methods. Participants will receive two graduate credits upon program completion.

Preparing to Teach High School Economics

\$43,957

Minnesota Council on Economic Education

Dr. Donald Liu

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The program is designed for 25 teachers new to teaching economics and needing to increase their understanding of the principles and concepts included in the state academic standards in economics. Course activities will consist of an intensive five-day summer seminar that outlines an appropriate scope and sequence for a high school economics course, two follow-up Saturday sessions during the academic year to monitor teaching experiences, to provide additional content instruction, and to discuss plans for the development and implementation of an economics learning activity; and guidance for the course project. A classroom implementation specialist will provide ongoing mentoring, monitor an online portal for teachers to communicate with each other, and offer one-on-one consultation. Participants will receive two graduate credits upon program completion.