Math in the Middle Newsletter October 2008
NEBRASKA MATH

By: Jim Lewis

The University of Nebraska-Lincoln recently received a $9.3 million grant from the National Science Foundation for “NEBRASKA MATH”, a statewide program aimed at improving mathematics achievement for all students.

The University’s success in obtaining this grant is evidence of the high regard the NSF has for Math in the Middle and the partnership we have created with ESUs across the state. Our challenge now is to grow into a sustainable K-12 – University partnership that is a national model for how K-12 educators and university faculty work together to strengthen mathematics education.

The Math in the Middle PIs, Jim Lewis, Ruth Heaton, Tom McGowan and Barb Jacobson will also be PIs for the NEBRASKA MATH grant. They are joined by Carolyn Edwards, Cather/Bessy Professor of Psychology, Walt Stroup, Chair of the Department of Statistics, and Ira Papick, Professor of Mathematics.

NSF funding for the original Math in the Middle Institute is ending and we are faced with the challenge of continuing, and even expanding, high quality professional development for mathematics teachers with local dollars. Our vehicle for this will be called the NU-Teach Institute for Math and Science Teachers. For the next five years, UNL will offer summer professional development courses for math (and science) teachers at a discounted price using the concentrated delivery model piloted by Math in the Middle. Our hope is that local school districts and ESUs will take advantage of this opportunity and use their professional development dollars to ensure that it is financially feasible for their teachers to take these courses. We also want to experiment with offering these courses at various sites across the state. For example, in Summer 2008, NU-Teach courses were taught in Hastings and in Norfolk. Talk with your ESU representative about whether or not a NU-Teach course will be offered in your area in Summer 2009.

We are also pleased to announce that we have received a $600,000 supplement to our Math in the Middle grant that will enable a cohort of teachers from Omaha Public Schools to participate in the Math in the Middle Institute. This supplement and the inclusion of Papillion - La Vista Public Schools as a NEBRASKA MATH core partner are our initial efforts to extend our partnership into the Omaha metropolitan area.

Jim Harrington, Supervisor of Mathematics for Omaha Public School District, said, “We’re very excited for the opportunity to participate in the Math in the Middle Program. We like the stronger math content for our teachers.”
NEBRASKA MATH consists of three new components plus an initiative to continue the institute created by Math in the Middle. The three new components are (1) Primarily Math, an initiative for K-3 teachers, (2) Extending Success in Algebra to all Students (ESAS) for teachers of algebra, and (3) Retaining Quality Teachers (RQT), an initiative for new secondary teachers of mathematics.

Efforts to improve mathematics education initiated by the Math in the Middle Institute Partnership will be continued through NU-Teach, an institute offering professional development opportunities for math (and science) teachers. To view the University’s official press release visit http://newsroom.unl.edu/releases/2008/10/01/$9.3+million+will+support+UNL-schools+partnership+to+boost+math+skills.

The NEBRASKA MATH grant is a partnership of UNL, Lincoln Public Schools, Grand Island Public Schools, Papillion-La Vista Public Schools and 14 rural Educational Service Units. Three school districts have explicitly identified as core partners because of a special commitment to support a research study that will be part of Primarily Math. However, it should be noted that the proposal stresses the desire to continue the partnership begun by Math in the Middle with all 14 rural ESUs. Thus, NEBRASKA MATH will continue to have a strong commitment to rural Nebraska even as we extend our partnership to districts in the metropolitan Omaha area.

Because NEBRASKA MATH will be a larger and more complicated program, it will take a few months to iron out the details as to how a local school district or ESU can participate in one or all aspects of the NEBRASKA MATH partnership. We will keep all of our Math in the Middle partners updated throughout this process. For now, here is an overview of our programs:

- **Primarily Math:** This component of the grant is an initiative to strengthen mathematics education in the early grades. We will create a K-3 Mathematics Specialist graduate program at UNL and educate outstanding teachers so that they have the mathematical and pedagogical knowledge needed to improve mathematics achievement for all students. Approximately 120 teachers will be supported by this program. This part of the grant will also include a major research project designed to inform the nation as to the most effective (and financially efficient) approach to strengthening K-3 mathematics education.

- **Extending Success in Algebra to all Students (ESAS):** This portion of the grant will engage 120 Algebra I teachers in content and pedagogical coursework and support them as they work to ensure that all students succeed in this important gateway course.

- **Retaining Quality Teachers (RQT):** this component of the grant is an “induction” program designed to support teacher retention and to work with them as they make the transition from a well started beginner to a master teacher. We will offer graduate coursework to new secondary mathematics teachers and mentor them as they confront the issues faced by all new teachers.

- **NU-Teach:** Please see previous article in newsletter.

We are delighted that all 14 rural ESUs will continue to work with us as we launch NEBRASKA MATH. We look forward to the opportunity to continue working with you to improve mathematics education and student achievement across the entire state of Nebraska. Watch for additional details regarding each of the above features of NEBRASKA MATH in future newsletters.
Math Teachers’ Circle

The Math Teachers’ Circle, a monthly gathering for dinner and a math problem, is now in its second year. Math teachers from Lincoln and surrounding areas (from as far as Crete, Friend and Shickley), have been gathering one Thursday evening each month to enjoy a simple dinner and an opportunity to network and learn from each other. The circle is comprised of not only middle-level mathematics teachers, but also administrators, ESU representatives, mathematicians and mathematics educators “to discover and pass along to students the excitement and richness of problem solving in deep yet accessible mathematical topics.” The circle provides a forum that allows fun, exciting, and energizing classroom activities to freely flow. According to their literature, “The aim of The Teachers’ Circle is to ‘immerse a group of educators in engaging topics and equip them with an effective problem-solving approach to teaching mathematics.’”

Photos from the last circle are available in a slide show at the CSMCE Web site located here: http://scimath.unl.edu/MIM/slideshow/phpslideshow.php?auto=1.

The Teachers’ Circle will meet five more times during the 2008 – 2009 school year. Please see below for more information:

<table>
<thead>
<tr>
<th>Session Dates</th>
<th>Location</th>
<th>RSVP Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 20</td>
<td>TBA</td>
<td>November 13</td>
</tr>
<tr>
<td>January 22</td>
<td>LPSDO E111</td>
<td>January 15</td>
</tr>
<tr>
<td>February 19</td>
<td>LPSDO E111</td>
<td>February 12</td>
</tr>
<tr>
<td>March 19</td>
<td>LPSDO E111</td>
<td>March 12</td>
</tr>
<tr>
<td>April 16</td>
<td>LPSDO E111</td>
<td>April 9</td>
</tr>
</tbody>
</table>

If you are interested in participating, contact Anne Schmidt: aschmid@lps.org

For more information, please visit the Teachers’ Circle Web site at: www.nebrwesleyan.edu/people/cminer/teachercircle.html

Math Challenge Corner

The Prisoner’s Dilemma

An example of a classic problem in a branch of mathematics entitled game theory is The Prisoner’s Dilemma. The problem was originally framed by Merrill Flood and Melvin Dresher working at RAND in 1950, and formalized by Albert W. Tucker in 1992.

Here is the prisoner’s dilemma problem in its classical form:

Two suspects are arrested by the police. The police have insufficient evidence for a conviction, and, having separated both prisoners, visit each of them to offer the same deal. If one testifies (“defects”) for the prosecution and the other remains silent, the betrayer goes free and the silent accomplice receives the full 10-year sentence. If both remain silent, both prisoners are sentenced to only six months in jail for a lesser charge. If they betray the other, they both receive a five-year sentence. Each prisoner must choose to betray the other or to remain silent. Each one is assured that the other would not know about the betrayal before the end of the investigation.

Assuming that each prisoner prefers a shorter sentence to a longer one, they need to consider the consequences of cooperating with their accomplice (by remaining silent) or betraying their accomplice (by confessing to the crime).

What should the prisoners do?

Hint: One way to analyze the problem is to assign appropriate numerical values to the outcomes and analyzing them from each prisoner’s perspective using a grid like the one shown below.

Prisoner 1                              Prisone 2
                                      Stay silent | Confess
                                      Stay silent | Confess

For a complete analysis of the problem, check out Kacy Heiser’s expository paper entitled Mathematics and Evolution on the Math in the Middle Web site at http://scimath.unl.edu/MIM/mat.php.

A pupil from whom nothing is ever demanded that he cannot do, never does all he can.

– John Stuart Mill

Clockwise from left: Julie Kreizel (LPS); Mike Cobelens (Waverly); Cheryl Miner (NE Wesleyan); and Sue Graupner (LPSDO).