NebraskaMATH April 2009 Newsletter
We were very pleased with the number and quality of applications to the NebraskaMATH programs. Teachers selected to participate in the NebraskaMATH programs represent 108 schools from 13 ESUs from across the state. Here is the breakdown for each of the NebraskaMATH programs:

**Primarily Math**
- 114 K-3 teachers have been selected, 34 of them will begin coursework this summer on the UNL campuses. Courses begin June 8 and run until June 19.
- 26 teachers will begin coursework in summer 2010, which will take place in Omaha
- 54 teachers will begin coursework in summer 2011; there will be two sessions, one in Lincoln and one in central Nebraska.

**Nebraska Algebra**
- Two cohorts of 39 algebra teachers will begin coursework this summer on the UNL campus. One will convene June 22 through July 3, the other July 13 through the 24.
- 15 algebra teachers will begin coursework in summer 2010, which will take place in central Nebraska
- one algebra teacher will begin coursework in 2011

**New Teacher Network (NTN)**
- 14 teachers have been admitted to the NTN, and will begin their program this summer with the Nebraska Algebra teachers, See dates above

**Math in the Middle**
- 33 teachers in Cohort 4 will continue their coursework this summer, culminating in Master’s Degrees conferred upon them in August.
- 20 teachers from our OPS Cohort will take four courses this summer. Check [http://scimath.unl.edu/MIM/news.php](http://scimath.unl.edu/MIM/news.php) for the dates of all M² courses.

We are looking forward to working with all NebraskaMATH teachers as we strive to improve mathematics achievement for all students. As always, we will continue looking for new funding sources to enable us to extend these outstanding opportunities to more Nebraska teachers.

It’s not too late to apply!

Teachers who are not yet participating in a NebraskaMATH program still have an opportunity to do so. Next fall we will accept applications from those who wish to begin Primarily Math courses in summer 2011 or participate in Nebraska Algebra in summer 2010. While the second cohort of New Teacher Network teachers will not begin until 2011 (at the earliest), we still have a few slots open for participation beginning this summer. Please contact Jim Lewis, jlewis@math.unl.edu, or Shannon Parry, sparry3@unl.edu, as soon as possible if you are interested.

Principals are Welcome!

All principals and administrators of teachers who will be participating in any of the NebraskaMATH (or Math in the Middle) programs this summer are welcome to stop by and observe a class at any time they are in Lincoln (or in other locations where our courses are being offered). If you would like to plan a visit, we would appreciate receiving advance notice so that we can be prepared for your visit and can assist you with any necessary arrangements. To schedule a visit, please contact Shannon Parry at sparry3@unl.edu.

In addition, we are planning to schedule events specifically intended for principals of NebraskaMATH teachers during the weeks in which the teachers are taking courses. We recognize that in order to really make a difference in mathematics education we need principals’ support. Please watch for more information in future newsletters and other correspondence.
Register Now
for the Nebraska Math & Science Summer Institutes

Nebraska’s K-12 Math & Science teachers are encouraged to register for professional development courses offered through the Nebraska Math & Science Summer Institutes. The University of Nebraska-Lincoln has made these opportunities available to Nebraska teachers at discounted rates and offers fellowships to cover fees. In addition, most class sessions are completed in one or two weeks’ time, minimizing the duration of the time commitment required to complete a course. Finally, if a course is not offered in your area, special rates for apartment style housing and meal packages are available at the UNL campus. For additional information about each of the courses and for registration information, visit our website at scimath.unl.edu/summer or contact Shannon Parry (sparry3@unl.edu) and ask for either an electronic or paper brochure.

### Nebraska Math & Science Summer Institutes Course Listing

#### Courses for Kindergarten - 4th Grade Teachers

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| June 22-26 & June 29-July 3 | Math 896: Algebraic Thinking for the K-4 Classroom  
|              | TEAC 801: Curriculum Inquiry                                             |

#### Courses for Middle Level Mathematics Teachers

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| June 8-12   | Math 802T: Functions, Algebra and Geometry for Middle-Level Teachers (Norfolk)  
|              | Math 802T: Functions, Algebra and Geometry for Middle-Level Teachers (Scottsbluff)  |
| June 15-19  | Math 804T: Experimentation, Conjecture and Reasoning (Kearney)  
|              | Math 806T: Number Theory and Cryptology for Middle-Level Teachers        |
| July 20-24  | Math 805T: Discrete Math for Middle Level Teachers                       |

#### Courses for Secondary Mathematics Teachers

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| June 8-12 & June 15-19 | CSCE 896: Special Topics in Computer Science: Alice, A Gateway to Computer Science  
|              | STAT 892: Statistics for High School Teachers                           |
| July 13-17 & July 20-24 | Math 896: Complex Analysis for Secondary Teachers  
|              | TEAC 896: Problems in Secondary Education                               |

#### Courses for Secondary Science Teachers

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| July 20-24  | NRES 814: Laboratory Earth: Earth’s Natural Resource Systems  
|              | TEAC 842: Objectives and Methods of Science Teaching: Inquiry and the Nature of Science |
Math Challenge Corner

Can You Find the Center of a Triangle?

featuring the work of Julie Hoaglund, M² Cohort 3

Finding the center of a triangle sounds like a simple task. Given a non-regular triangle, even a pre-school aged child could confidently point to a location which he or she believes is the “center” of the triangle. However, finding and defining the center of a triangle is a task that has challenged many famous mathematicians throughout history, such as Euclid and Pierre de Fermat. A sample of different types of triangle centers are shown:

- **The circumcenter of a triangle is located at the intersection of the three perpendicular bisectors; it is the center of the largest circle that will fit inside the triangle and touch all three sides.**
- **The incenter of a triangle is located at the intersection of the angle bisectors; it is the center of the largest circle that will fit inside the triangle and touch all three sides.**
- **The orthocenter of a triangle is located at the intersection of the three altitudes of the triangle.**

While much of the geometry we teach in our schools (including the different definitions of triangle centers above) is based on principles established by Euclid around 300 B.C., the discovery of a new type of center determined by a circle connecting four types of existing triangle centers, was made as recently as 1996. The discovery was made by June Lester (and is thus known as Lester’s Circle) and utilizes mathematics spanning from Euclid to modern times.

To learn more about Lester’s Circle and other types of centers of triangles, check out Julie Hoaglund’s expository paper entitled Lester’s Circle at [http://scimath.unl.edu/MIM/mat.php](http://scimath.unl.edu/MIM/mat.php)

Highlight on Action Research

Mathematical Communication, Conceptual Understanding & Students’ Attitudes Toward Mathematics

by Kimberly Hirschfeld-Cotton, M² Cohort 3

Abstract: This action research study of my 8th grade classroom investigated the use of mathematical communication, through oral homework presentations and written journals entries, and its impact on conceptual understanding of mathematics. This change in expectation and its impact on students’ attitudes towards mathematics was also investigated. Challenging my students to communicate mathematics both orally and in writing deepened the students’ understanding of the mathematics. Levels of understanding deepened when a variety of instructional methods were presented and discussed where students could comprehend the ideas that best suited their learning styles. Increased understanding occurred through probing questions causing students to reflect on their learning and reevaluate their reasoning. This transpired when students were expected to write more than one draft to math journals. By making students aware of their understanding through communicating orally and in writing, students realized that true understanding did not come from mere homework completion, but from evaluating and assessing their own and other’s ideas and reasoning. I discovered that when students were challenged to communicate their reasoning both orally and in writing, students enjoyed math more and thought math was more fun. As a result of this research, I will continue to require students to communicate their thinking and reasoning both orally and in writing.

To read Kim’s full paper and other action research papers from the first three cohorts, see [http://scimath.unl.edu/MIM/ar.php](http://scimath.unl.edu/MIM/ar.php)

One of the endlessly alluring aspects of mathematics is that its thorniest paradoxes have a way of blooming into beautiful theories.

– Philip J. Davis