

Strategies for Algebra II, Pre-Calculus and Calculus

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The goal of this presentation was to familiarize the participants with North Carolina's School of Science and Mathematics and its resources. The session gave teachers resources to use in their Algebra II courses that are engaging and "real world."

The session began with a brief discussion about the Elkhart Community Schools and Elkhart Memorial High School. Approximately 60% of the students are Caucasian, while about 20% are African American and 20% are Hispanic, although this population is growing rapidly. About half of the students receive free or reduced-price lunches, and about 15% of the students have been identified as special education students. Elkhart Community Schools has begun working on a curriculum shift in mathematics to get more students through Indiana's Core 40 diploma requirements. The number of students enrolled in Algebra II reflects these changes; enrollment has gone from 175 to 300 students. This has led to the current struggle, with an increased failure rate for Algebra II classes. Ideas that have been suggested include switching Algebra II with Geometry in the sequence of classes; rearranging the schedule so that Algebra II classes meet daily instead of on alternate days; or electing to "stay the course" and infuse relevance and rigor into the present curriculum.

The teachers at Elkhart Memorial High School have been casting around to look for ways to add rigor and relevance, including the use of technology, real-world applications for algebra, resources provided by the IMI project, and the North Carolina School of Science and Mathematics annual conference, held in January in Durham, near Duke University and the University of North Carolina.

I summarized my recent trip to the conference and made available resources discovered on the school's website. (See the website below.) I specifically went over a presentation given by Frank Griffin, from the Cate School in Carpenteria, California, that helps teachers use a graphing calculator effectively during instruction. He presented the "T⁵: Top Ten Teaching Techniques with Technology: Classroom Teaching Tips Using the TI-84 Calculator/Viewscreen." His tips included:

- Using a "guess the function" activity as a warm-up. The teacher hides the equations on a graphing calculator and students must guess the function.

- Having students use the overhead calculator to test conjectures.
- Playing guessing games to look for patterns, using tables and the “Ask/Ask” setting.
- Projecting graphs from the overhead calculator onto a white board so that the class can “write” on the graphs.
- Using a random number program to call on students by names or by numbers.
- Retracing equations by typing over them and using the STO-> key for testing conjectures.
- In $y = ax^2 + bx + c$, representing a coefficient with a list (L1), to show families of curves (as a series of graphs).
- In the DRAW menu, using graph data bases (GDB) for saving functions.
- Using Y VARS with the regular function notation (for example, $y_1(2)$ or $y_1(x+2)$).
- Using parametrics and polar curves to animate graph curves, using a stopwatch as you “replay” the action, and using the SEQUENTIAL and SIMUL modes.

I highlighted the use of graph data bases on Texas Instruments graphing calculators.

The session concluded with time for discussion. Many participants compared and contrasted their individual situations with my high school’s curricular arrangement and issues as we strive to increase the number of students who successfully complete Algebra II.

Websites:

<http://www.ncssm.edu/>

This is the website of the North Carolina School of Science and Mathematics (NCSSM).

<http://www.dlt.ncssm.edu/algebra/curriculum.htm>

This is an NCCSM Distance Learning and North Carolina Schools website. There are links to several activities appropriate for Algebra II.

<http://courses.ncssm.edu/math/TCMConf/TCM%202007/Talks/talks2007index.htm>

Here you can find the handouts and PowerPoint presentation from Frank Griffen’s session at the NCSSM annual conference.