

Purpose of the Report

At the December 2011 school board meeting the board requested that McNamara research and report on the current secondary school math program. Some parents were concerned that the program was not meeting the needs of students and that many students were not being successful in the program.

The report will include:

1. Background on the University of Chicago School Math Program (UCSMP);
2. BICS implementation of the program;
3. Summary of Student Success in Math Classes First Marking Period, 2011 -12
4. BICS students success on ACT years 2006 – 2011
5. Summary of Conversation with Char-Em ISD Math Consultant, Bill Aten;
6. Summary of High School Students' Responses to Teaching and Learning Strategies
7. Study Skills used by students who are earning A's or B's in the math classes.
8. Recommendations
9. Attachments

1. Background on UCSMP

Overall, UCSMP Grades 6-12 courses have three major goals. 1) Upgrade student achievement in mathematics; 2) Update the mathematics curriculum; 3) Increase the number of students who take math beyond algebra and geometry. UCSMP Grades 6-12 texts are in wide use throughout the United States. In addition to the more traditional math content that you are used to, you will observe your child doing more problem-solving than in more traditional math courses. We use the program for the very reason that it includes:

- ✓ Problem-solving activities that engage students' intellects;
- ✓ The use of geometry, statistics and probability in each course;
- ✓ The use of Activities and Guided Examples to help students become active learners;
- ✓ Daily Review questions that lead to mastery of concepts.

2. BICS Implementation of the UCSMP Curriculum

BICS implemented the UCSMP at the secondary level in the late 1990's. The typical UCSMP secondary math sequence is:

- 7th Grade Transition Math
- 8th Grade Algebra One
- 9th Grade Geometry or Algebra Two

- 10th Grade Geometry or Algebra Two
- 11th & 12th Grade Functions & Statistics, Calculus

BICS also offers math classes that are not part of the UCSMP materials. These classes vary from year to year depending upon need and desire of students. In the last few years they have included: Consumer Math, Applied Math, Business Math, College Math, Advanced Math, and other online options.

At the time of implementation of this typical schedule, BICS graduation requirements called for all students to earn 4 math credits, but there was no requirement as to which math courses were necessary. It was rare that a student graduated without Algebra One and Geometry and most students also completed Algebra Two. In some cases Algebra Two was spread out over 3 or 4 semesters instead of the more typical 2-semester course. With the advent of State of Michigan graduation requirements a few years ago, Algebra Two became a graduation requirement of ALL MICHIGAN students to earn a diploma.

This schedule is not set in stone. If an individual student is not ready for the cycle, modifications may be made with some students completing Algebra One in high school instead of 8th Grade.

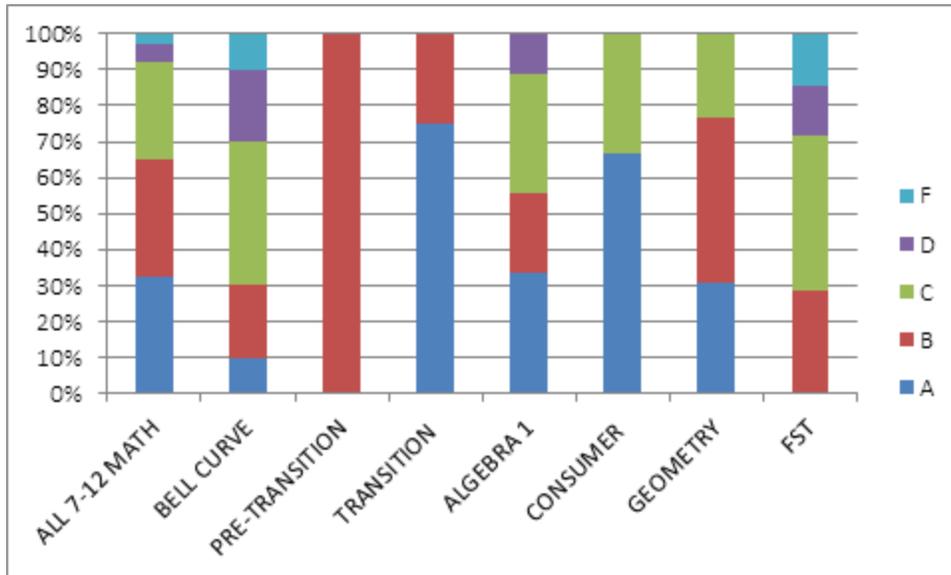
Experienced math teachers Connie Boyle and Glenn Cashman and principal McNamara spent several hours discussing typical hourly math schedules, lesson plans and grading practices. Together they have drafted guidelines which will allow the classes to be more standardized in presentation so the parents and students have a better idea of what to expect from the math classes. The guidelines reflect a balance between more traditional teaching strategies while maintaining the higher level thinking strategies of the Chicago Math Program. Both teachers have already been implementing some changes in their daily routines. Char-Em ISD math consultant, Bill Aten, has been given the draft guidelines for review as well.

3. Summary of Student Success in Math Classes

First Marking Period, 2011 -12

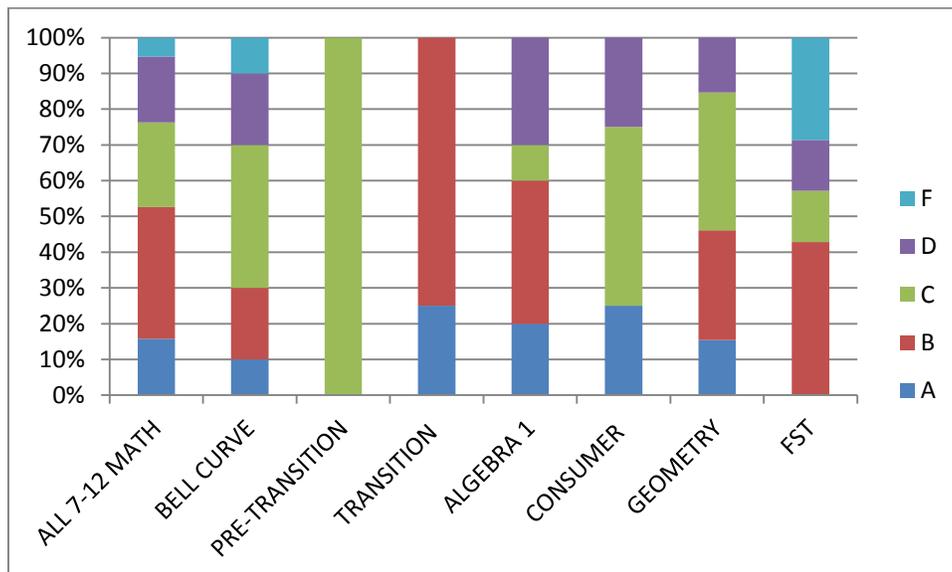
Thirty-seven students in grades 7-12 are enrolled in Math classes this year. I recorded the first marking period grades for all students and found these results: 12 students earned A's, 12 students earned B's, 10 students earned C's, 1 student earned a D and 1 student earned an F. Applying the normal bell curve theory to 37 students would mean you might typically expect the following grades: 3.7 students earning A's and 3.7 students earning F's, 7.4 students earning B's and D's respectively and 14.8 students earning C's. During the first marking period of 2011, BICS math students earned significantly more C's or higher than would be expected in a random

group (the bell curve group below). The chart reflects the actual report card grades for BICS 7-12 graders at the end of the first marking period.



First Semester, 2011 -12

I recorded the first semester grades for all students and found these results: 6 students earned A’s, 14 students earned B’s, 9 students earned C’s, 7 students earned a D and 2 students earned an F. Applying the normal bell curve theory to 38 students would mean you might typically expect the following grades: 3.8 students earning A’s and 3.8 students earning F’s, 7.6 students earning B’s and D’s respectively and 15.2 students earning C’s. During the first semester of 2011, BICS math students earned significantly more C’s or higher than would be expected in a random group (the bell curve group below). The chart reflects the actual report card grades for BICS 7-12 graders at the end of the first semester.



4. BICS Students Success on ACT Years 2006 – 2011

Of the BICS students graduating during the years 2006 -2011, those who earned an A or B in UCSMP courses scored an average ACT Math score of 24. According to ACT guidelines, an ACT Math score of 22 represents a 'workplace and college ready' math score. The average ACT Math score for students earning a D or above in the UCSMP courses is 21.8 and the score for students who did not follow the UCSMP was 17.2. The average ACT Math score for all BICS students graduating in the same time period is 20.6. Because of the statistically small numbers we work with, it is difficult to draw hard conclusions, but the quick look would indicate that students successfully completing the UCSMP courses have the math skills necessary to be ready for the workplace or college setting.

5. Summary of Conversation with Char-Em ISD Math Consultant, Bill Aten

On January 5, 2012 a conference call was held with Char-Em ISD math consultant, Connie Boyle BICS math teacher and Kitty McNamara. According to Bill Aten, several schools in the area still use UCSMP including Boyne City, Central Lake and Petoskey. He was unsure of East Jordan and Charlevoix. I still need to get information from those two.

Bill cited the following two reasons that schools typically move away from the Chicago Math program;

1. they do not like the cycling back to rehash or spiral back – some had the sense that this slowed them down in covering more new material,
2. or the other reason has more to do with students being frustrated with the need to persevere in problem solving and application level work. Many of these schools have not wanted to do the parent education and outreach to gain their support in pushing the students to persevere, especially in the higher level math classes. According to Charlevoix counselor "I spoke with one of our Math teachers and she said we used to use the Chicago Series and she loved it as a teacher, however parents do not like it. Not enough resources for parents to help so we now use McDougal Littell series. She said it's a good series. Parents like it a lot more since students and parents can refer to it."¹

It was Bill's opinion that the UCSMP meets all of the Common Core State Standards (CCSS) in Math and that BICS has shown success in using this program. He also said that districts that are not using this program, or similar math programs, are struggling to try to meet the new standards, particularly in the areas of 'Making sense of problems and persevere in solving them' and 'Reasoning abstractly and quantitatively'. It was Bill's opinion that regardless of which math program is used, the real challenge for all secondary schools is to convince students of the value of persevering to figure things out for themselves and to help them to feel good about figuring something out after working hard at it.

¹ Email communication from Charlevoix High School Counselor 1.10.12

Bill Aten felt that the guidelines established by Boyle and Cashman were solid – thought they showed a good blend of the traditional approach but still emphasize problem solving and student accountability.

6. Summary of High School Students' Responses to Teaching and Learning Strategies

Students in grades 9-12 were given a list of proven Chicago Math teaching and learning strategies and were asked to select the three they would most like to see used. Interestingly, the strategies preferred by the juniors and seniors were different than those preferred by the younger students.

11th & 12th Graders chose these three as strategies they would most like to see used:

- Activities can be completed in small groups or as a whole class. Activities help students discover new concepts together. (Only two 9th & 10th graders selected this strategy.)
- Have students read each lesson and do all the questions before class. Then discuss the lesson and engage in various activities during the next period. (No 9th & 10th graders selected this strategy.)
- Go over the Covering the Ideas orally in class after the students have read the lesson. (Only two 9th & 10th graders selected this strategy.)

9th & 10th Graders chose these three as strategies they would most like to see used:

- Preview the next day's lesson, highlighting key points students may need to know to read the lesson and answer the questions. (This was also important to 11th & 12th graders, but not a top 3 choice.)
- Display answers on an overhead projector or computer at the beginning of the class to review homework questions. Have students grade their own papers. Groups of students can then discuss questions that were missed and explain answers to each other. (This was somewhat important to 11th & 12th graders, but not a top 3 choice.)
- Use cooperative reading strategies in the classroom. The class reads a lesson and then in small groups each student identifies a key idea from the lesson and explains it to the group. Ask students to read aloud occasionally. Point out that the red headers in each lesson identify the main ideas of the lesson. (This was also important to 11th & 12th graders, but not a top 3 choice.)

7. Learning strategies used by students who are earning A's or B's in the math classes.

Students in grades 7-12 were asked to list the strategies they use to earn A's or B's in UCSMP courses at BICS. This is a sample of the answers, there were many more that were similar.

During Class:

- I pay attention and asked for help all the time; I pay attention and followed directions; I ask questions and do notes and work; I do less talking to others; I concentrate to get my work and homework done, not talk; I ask questions if I don't know what to do ...

During Seminar:

- I do my math homework, do my homework and ask questions, I do my math homework, get my work done, talk and have fun later; I do my notes; work on math & ask for help if I need it

After School:

- Work on math projects; work quietly at home; do leftover homework or study; make sure I have all my work done and ready for the next day before sports; I use my structured study and seminar, so often I do not have to take things home...

Before Tests:

- Go over the chapter quizzes, ask questions about what I don't understand; study hard and get help from Mrs. B.; study; study as much as I can and look over other materials; study some and review....

After Tests:

- Go over things to see what I did wrong; find out why I got questions wrong and ask questions; correct the test and see what I got wrong; figure out how I got things wrong...

These strategies coincide with a typical list of successful high school study habits. If you do an interne search on how to do well in high school, you will find many of these same strategies. Additionally, of the 18 students who returned the questionnaire, 13 reported that they missed class 2 or fewer times. Of the same group all reported seeking help from the teacher outside of class time; 5 do so occasionally, 7 reported seeking outside of classroom help 3-5 times and 6 reported seeking help more than 5 times outside of the classroom period.

8. Recommendations:

- More common classroom instructional routines which incorporate instructional strategies defined by students (see attachments)

Math Class At-a-Glance

- 10 minutes – Notes and Homework check (points based on completion)
 - 30 minutes - Teacher answers questions on homework and explains Applying the Math problems
 - 10 minutes – Teacher previews reading/does example from tonight’s homework
 - Fridays – Weekly quiz (students should study all problems: Covering, Applying, Review)
 - Chapter Test* approximately every 3 weeks (Study Chapter Review & Self-Test sections)
 - Projects and Class Activities throughout the marking period
 - Grade: Quizzes, Activities, Homework (15-25%) -- Tests (50-60%) – Projects (20-30%)
 - Powerschool: Mrs. Boyle’s classes are based on total points – Example: tests are worth more points than homework and projects. Mr. Cashman’s classes are based on category weights – he will send home progress reports showing student’s progress in each category, as categories do not show on parent or student view.
 - *May be retaken – will require recovery packet/extra time with teacher
- Continue use of modified grading scale for UCSMP courses
 - Plan a secondary level parent ‘Curriculum Information’ event with
 - Make sure parents and students know about tutoring options
 - Complete thorough screening of students for recommendation to advanced level math classes
 - Evaluate student scores on Explore and Plan and recommend math support in the form of tutoring, summer school or after school program
 - Continue to provide professional development for all Math teachers (including elementary)

9. Attachments:

- a. Common Core State Standards for Mathematics – pages 6-8**
- b. BICS Math information Grades 7-12**