



Using CRISS in High School Mathematics Instruction

by Guy Todnem

The Mathematics Department at Glenbard East High School (GEHS) in Lombard, Illinois, is currently exploring how to best use CRISS strategies in its courses. GEHS is one of four large suburban high schools in Township High School District 87, 20 miles west of Chicago. Each of the high schools in District 87 is implementing Project CRISS and, in the case of GEHS, CRISS has been identified as a key piece of its School Improvement Plan to help boost student math achievement. GEHS has an enrollment of 2,600 students. (For more information about the district, visit <http://www.glenbard87.org/>.)

Through the leadership of District 87 Associate Superintendent Dr. Pam Zimmerman, District 87 Literacy Coordinator Sandra Coughlin, and the GEHS Literacy Coach Laura Koenig, I trained many of the district teachers with the CRISS principles and strategies during the fall of 2007. Math teachers comprised approximately one-third of each participant group. At the end of every workshop, I posted flip chart paper around the room with the names of each attendee. I invited the educators to write on the paper one or two CRISS strategies they planned to implement in their current teaching units, along with a short description of how they would use them. I asked that they select strategies they would be willing to share at a later date with their colleagues. I told the participants sharing would be electronic (district/school faculty electronic network), as well as through discussions in department meetings. The mathematics department chair David Elliott encouraged his department members to share the following information with each other:

1. The CRISS strategy they used.
2. Examples of their handout(s) and/or student work samples.
3. Their reflections on how well the strategy helped their students engage in the lesson and comprehend the math content.

Following are two examples teachers shared.

1

Ms. Valerie Pinzker, in her Algebra I and Pre-Calculus courses, adapted the **Word Combining** strategy (CRISS manual, 3rd ed., pp. 219-220) with these directions: “*Combine 5 math terms or phrases into no more than two (meaningful) sentences.*” The following lists show the concepts Ms. Pinzker had her students use.

Algebra I:

- Order of Operations, Simplify, Exponent, Distributive Property, Left-to-Right Rule
- Fraction, Improper Fraction, Mixed Numbers, Decimal, Repeating Decimal
- Mean, Median, Mode, Average, Data
- Base, Exponent, Power, Greatest Common Factor, Prime Factorization
- Prime Number, Composite Number, Divisibility, Factors, Factor Tree
- Absolute Value, Positive Number, Negative Number, Origin, Number Line

Pre-Calculus:

- Sine, Cosine, Graph, Period, Amplitude

I asked teachers at a recent CRISS workshop to create some sentences for this list and here is what they wrote:

Sample Sentences:

Algebra I:

1. *Rules for order of operations* help *simplify* sentences using the *left-to-right rule*. In the *Distributive Property*, compute the *exponents* before working the other operations.
2. To change an *improper fraction* to a *mixed number*, divide the numerator by the denominator and express the answer in whole numbers and *decimals*. If you have a *repeating decimal*, express it with a “bar” over the repeating number.
3. *Mean, median, and mode* are three ways to talk about “*averages*” when you look at *data*.
4. A *power* is an *exponent* that tells us the number of times we multiply the *base* number. *Prime factorization* is one way to find the *greatest common factor*.
5. A *composite number* is the product of *prime numbers*. The *factors* of a *composite number* can be shown on a *factor tree* that shows its *divisibility*.
6. The *absolute value* of a *positive* or *negative number* is determined by how far it is from the *origin* (zero) on the *number line*.

Pre-Calculus:

1. *Sine* and *cosine graphs* can have the same *period* but different *amplitudes*.
2. The *period* and *amplitudes* of *sine* and *cosine graphs* tell me the same information as “*length and height*” in geometrical shapes.
3. In the *graph* $y = 5 \sin X$ the *amplitude* is 5 and the *period* is a multiple of π .

2

Mr. Jeff Sabol, in his Algebra I course, wanted his students to become aware of the **Author’s Craft** (CRISS manual, 3rd ed., pp. 17-31) in their textbook. Specifically, Mr. Sabol wanted to heighten student awareness in the areas of *presenting main ideas*, *typographical features*, and *internal features*. He skillfully integrated the student analysis of text structure with the CRISS strategy of **Two-Column Notes** (CRISS manual, 3rd ed., pp. 118-141). He provided the following directions to his students. “*Use Two-Column Notes to identify the special features of your math book, with the names and page numbers of specific features in the left column and how the author thought it would help you learn in the right column.*” Click [here](#) to see examples of his students’ work.

For more information about the use of Project CRISS strategies in the Glenbard High Schools, contact Associate Superintendent for Instruction Dr. Pam Zimmermann <pam_zimmermann@glenbard.net> or District Literacy Coordinator Sandra Coughlin <Sandra_coughlin@glenbard.net> .



About the Author: Guy Todnem recently retired from the DuPage County Regional Office of Education Professional Development Center, located just outside of Chicago. He has had numerous articles published pertaining to staff development and has experience teaching math and science to elementary, middle, and high school students. Guy is a CRISS National Trainer and currently resides in Winfield, Illinois.

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