# DCMS SCHOOL WIDE MATH SMART GOAL 2010 - 2011

##### MEASURE

## Tools we’ll use to determine

*where students are now and whether they are improving*

##### TARGET

The attainable performance level we would like to see

##### INDICATOR

*Standards and objectives*

*(weak areas for students)*

#### SMART GOAL

*Specific + strategic,*

*measurable, attainable,*

*results-oriented, timebound*

By the end of the 2011 school year, the math goal is to see the percentage of students currently below proficiency decreased by at least 13.3%, and the overall math scores will increase by 10% over the previous year’s scores.

100% of the math teachers monitor and make corrective measures to ensure that students first work problems on paper and or use manipulative before students answer an assessment question on their mastery check.

100% students are able to work problems on paper and/or using manipulates before answering assessments by last mastery check

Average mastery check scores no longer in the level 1 range (87% of students achieve at level 3 or above)

Math coach visits with each math teacher to design formative assessment strategies and review classroom indicator data prior to each mastery check

Formative assessments are constructed to analyze student responses.

(students explain their thinking)

Multiple step problem solving student assessments are conducted after each mastery check to determine student depth of knowledge

100% of the math teachers participate in student reflection process to determine individual student differences in calculating math problems

100% of the math teachers participate in item analysis review after each mastery check

Students are aware of state test taking strategies through mastery checks

State assessments are simulated during mastery checks in four phases of development.

Students are taught and monitored to work problems on paper before they answer questions on mastery checks

Formative assessment strategies for measuring student reflective thinking is put into place by February.

87% students proficient or above on the 2011 State Assessment

Item analysis of mastery checks to identify by indicator weaknesses

Mastery check review; students are asked reflective questions on how they determined their answers on mastery checks

Develop formative assessment strategies that provide student reflective thinking

100% of 7th and 8th grade students are able to write a math SMART Goal constructed from an essential indicator using student friendly language by second the second mastery check

Individual students create a 9 week SMART Goal which is developed around the weakest math indicators

Hire consultant to model student SMART Goal development while teachers monitor process

100% of the math teachers will post the essential indicator in student friendly language on the board as a daily objective reference for student clarity of focus

Students develop individual math SMART Goals every 9 weeks during Homebase which are reviewed every Friday

Grade level math PLC's develop SMART Goal before each mastery check based upon the weakest indicators from the math pacing guide

Math Grade Level PLC's use Data Analyses Worksheet to develop SMART Goals for any indicator below 60%

100% of the math Grade Level PLC's have SMART Goals posted by the first mastery check

80% of the math teachers successfully meet each SMART goal in all sub groups

Mastery checks are reviewed and data posted to measure SMART goal accomplishments

80% of the Math Tier 3 students identified for additional support attend a Saturday School session during the specified term

Mastery checks are reviewed and individual students are identified for additional Saturday School re-teaching opportunities

Data from Tier 3 Math programs are monitored monthly for extended Tier 3 offerings

60% of the Math Tier 3 students identified for re-teaching will score 60% on their second mastery check

Data from mastery checks is monitored for Tier 2 interventions and re-teaching opportunities are provided

Homebase structures are reorganized on Wednesdays and Thursdays to accommodate re-teaching opportunities

60% of the Math Tier 2 students identified for re-teaching will score 60% on their second mastery check

KMA classes are reorganized quarterly for students needing extra support.

**GRADE EIGHT**

M.8.4.1.K3 Avg = 42 ; Finds the probability of a compound event composed of two independent events in an experiment, simulation, or situation

M.8.1.4.A1 Avg = 45 ; Generates and/or solves one- and two-step real-world problems using computational procedures and mathematical concepts with

a) rational numbers

b) the irrational number pi as an approximation

c) applications of percents

M.8.2.4.A2 Avg = 50 ; Determines if a given graphical, algebraic, or geometric model is an accurate representation of a given real-world situation

M.8.1.2.K2 Avg = 51 ; Identifies all the subsets of the real number system [natural (counting) numbers, whole numbers, integers, rational numbers, irrational numbers] to which a given number belongs

M.8.1.1.K5 Avg = 56 ; Knows and explains what happens to the product or quotient when

a) a positive number is multiplied or divided by a rational number greater than zero and less than one

b) a positive number is multiplied or divided by a rational number greater than one

c) a nonzero real number is multiplied or divided by zero

M.8.1.4.K2 Avg = 57 ; Performs and explains these computational procedures with rational numbers

a) addition, subtraction, multiplication, and division of integers

b) order of operations (evaluates within grouping symbols, evaluates powers to the second or third power, multiplies or divides in order from left to right, then adds or subtracts in order from left to right)

M.8.2.2.A1 Avg = 59 ; Represents real-world problems using

a) variables, symbols, expressions, one- or two-step equations with rational number coefficients and constants

**GRADE SEVEN**

M.7.3.2.A1 Avg = 38 ; Solves real-world problems by

M.7.3.2.K4 Avg = 51 ; Knows and uses perimeter and area formulas for circles, squares, rectangles, triangles, and parallelograms

M.7.4.2.A3 Avg = 53 ; Recognizes and explains

a) misleading representations of data

b) the effects of scale or interval changes on graphs of data sets

M.7.2.1.K1 Avg = 57 ; Identifies, states, and continues a pattern presented in various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes

a) counting numbers including perfect squares, cubes, and factors and multiples (number theory

b) positive rational numbers including arithmetic and geometric sequences (arithmetic: sequence of numbers in which the difference of two consecutive numbers is the same, geometric: a sequence of numbers in which each succeeding term is obtained by multiplying the preceding term by the same number)

M.7.2.2.A1 Avg = 59 ; Represents real-world problems using variables and symbols to write linear expressions, one- or two-step equations

How teachers use assessment plays a major role in achieving standards. Assessments can be diagnostic, formative, and summative.  As you read about those categories in what follows, consider the seven assessment and grading practices for effective learning suggested by Jay McTighe and Ken O'Connor (2006):

1. Use summative assessments to frame meaningful performance goals. ... To avoid the danger of viewing the standards and benchmarks as inert content to “cover,” educators should frame the standards and benchmarks in terms of desired performances and ensure that the performances are as authentic as possible.  Present those tasks at the beginning of a new unit.
2. Show criteria and models in advance.  Rubrics and multiple models showing both strong and weak work help learners judge their own performances.
3. Assess before teaching.
4. Offer appropriate choices.  While keeping goals in mind, options judiciously offered enable students different opportunities for best demonstrating their learning.
5. Provide feedback early and often.  Learners will benefit from opportunities to act on the feedback—to refine, revise, practice, and retry.
6. Encourage self-assessment and goal setting.
7. Allow new evidence of achievement to replace old evidence. (pp. 13-19)

The curriculum we teach should revolve around enduring understandings that we wish all learners to have about mathematics and any other disciplines.  In the words of Carol Ann Tomlinson and Jay McTighe (2006), this will help "uncover" the content standards deemed essential. **Understanding by Design (UBD)** is a model of curriculum development that focuses on what to teach and how, and the assessment evidence to collect.  It is the companion to differentiated instruction.  McTighe and Grant Wiggins (2004) defined the model, which is often called “**Backwards Design**,” as a three stage process in which alignment is a key word.  The model is useful for both short range and long range planning.

**Stage 1, Desired Results**, includes writing goals linked to state and national standards, identifying enduring understandings (the "Big Ideas") framed as full sentences, writing essential questions tied to those understandings, and identifying what students will know and be able to do (skills).  Enduring understandings cannot be read in a book.  They are abstract and require “uncovering.”  The understandings need to complete the stem, "Students will understand that..." The essential questions need to be provocative and engaging enough to serve as a hook for students; good essential questions will lead to retention and transfer.  Foundational knowledge and skills need to be a comprehensive list of facts and skills to underpin the unit (McTighe & Wiggins, 2004).

What students know and will be able to do are closely tied together, but are not the same.  Jane Pollock (2007) distinguished between declarative (content mastery) and procedural  (skill mastery) knowledge.  "In a curriculum document, the statements of declarative knowledge (facts, concepts, generalizations and principles) are identified by the words understands or knows" (p. 35) that "serve as placeholders for active verbs, which translate into activities and experiences that help students organize declarative knowledge."  For procedural knowledge, a statement of student learning would begin with "a verb that describes the steps that need to be practiced to attain automaticity such as add, compose, sing, draw, or graph" (p. 36).  The latter requires extensive repetition and practice.

In terms of differentiated instruction, the established goal (content standard), understandings and essential questions should not be differentiated.  Knowledge and skills may be differentiated (Tomlinson & McTighe, 2006, p. 36).

**Stage 2, Assessment Evidence**, includes development of performance tasks and providing other evidence of learning.  "A performance ability lies at the heart of understanding" and is linked to a real work task that an adult might typically do.  It is the "evidence of being able to transfer what we know" (Wiggins & McTighe, 2005, p. 7). Performance tasks can be constructed by completing stem statements associated with the **GRASPS** model. Not every task needs to be formed using GRASPS, although Wiggins and McTighe (2005) propose at least one task for assessing understand in a major unit or course be developed this way (p. 158). Representative stems follow, as selected from McTighe and Wiggins (2004, p. 172):

* **G**, Goal: Your goal is to
* **R**, Role: Your job is ...
* **A**, Audience: Your target audience is ...
* **S**, Situation: The challenge involves dealing with…
* **P**, Product, Performance, and Purpose: You need to develop…so that…
* **S**, Standards and Criteria for Success: Your product must meet the following standards: …

Performance assessments should involve meaningful, authentic, and engaging tasks.  Rubrics, which are criterion-based scoring tools, should be included by which you and learners can assess their products or performances.  They should have point values attached to assessment criteria, with the traits specified from greatest to least strengths.  For example, a four-point scale (high to low) might include criteria for exceeding expectations, meeting expectations, almost meeting expectations, and not meeting expectations.  Care should be taken that the rubric is easy to use.  Other evidence of learning should include opportunities for student self-assessment and self-adjustment based on feedback.

In terms of differentiated instruction, performance tasks and other types of  assessment evidence may be differentiated.  Response modes might have been orally, visually, or in writing.  However, key criteria for evaluating should not be differentiated, as they are linked to content goals (Tomlinson & McTighe, 2006, p. 35).

**Stage 3, Learning Plan**, involves planning learning activities and an action plan that engages learners.  Learning activities should be organized and well-sequenced.  They should align with enduring understandings, essential questions, and standards. The action plan follows a **WHERETO** model.  Strategies suggested in Tomlinson and McTighe (2006, pp. 120-126) follow steps in the model.  The learning plan should be differentiated (p. 36):

* **W** indicates that you are helping learners to know where the unit is headed and what is expected from them.  You are also determining what their prior knowledge is.  Strategies: Provide rubrics with examples from prior student work tied to different levels of the rubric.
* **H** stands for the need to hook the learners and hold their interest. Strategies: Hooks might take the form of "provocative essential questions, counterintuitive phenomena, controversial issues, authentic problems and challenges, emotional encounters, and humor" (Tomlinson & McTighe, 2006, p. 123).
* **E** is equipping learners to succeed, enabling them to experience key ideas and explore issues.   Strategies: Provide a balance of constructivist learning experiences, structured activities, and direct instruction.
* **R** is providing opportunities for learners to rethink and revise their work and understandings.  Strategies: Rethinking and revision might be encouraged by "playing the devil's advocate, presenting new information, conducting debates, establishing peer-response groups, and requiring regular self-assessment" (Tomlinson & McTighe, 2006, p. 124).
* **E**, again, allows students to evaluate their work and set future goals.  Strategies: Provide regular opportunities for students to develop metacognitive skills of self-evaluation, self-regulation, and reflection.
* **T** stands for tailoring to accommodate the diverse needs, interests, and abilities of learners, including those with special needs who might have individual education plans. Strategy: Provide options for assignments with levels of difficulty associated with learners' knowledge levels, interests, and abilities.
* **O** stands for organization to sustain engagement and the learning process.

RESOURCE: [Computing Technology for Math Excellence](http://www.ct4me.net/curriculum.htm#Curriculum Essay)

BOOK PURCHASE: [Mathematics Assessment: A Practical Handbook for Grades 6–8](http://www.nctm.org/catalog/product.aspx?ID=721)

BOOK PURCHASE[: Mathematics Assessment Sampler 6-8](http://www.nctm.org/catalog/product.aspx?ID=12940)