

# ***Everyday Mathematics***

## **Alternative Assessments**

**Lois Huntington**  
**School City of Hammond**

The National Council of Teachers of Mathematics, in their *Principles and Standards for School Mathematics* (2000), calls for assessment that is:

more than merely a test at the end of instruction to see how students perform under special conditions; rather, it should be an integral part of instruction that informs and guides teachers as they make instructional decisions. Assessment should not merely be done *to* students; rather, it should also be done *for* students, to guide and enhance their learning. (p. 22)

Teachers using a standards-based and reform-minded curriculum for the first time may find that they are uncertain of the role assessment plays and how to use assessments that are alternatives to the traditional end-of-unit exams. This is what happened to teachers in the School City of Hammond, when they adopted the standards-based curriculum, *Everyday Mathematics*. Teacher leaders in the district who were members of the Indiana Mathematics Initiative Select Cadre worked to understand how to implement the alternative assessments embedded in the program itself, and then sought ways to share their findings with the other teachers in the district.

### **Implementing a Standards-Based Curriculum**

In 1999 several Hammond teachers asked to be allowed to use a reform-minded curriculum, the *Everyday Mathematics (EM)* program, for the school year 2000–2001. The following year additional teachers requested that they also be allowed to use this curriculum in their classrooms. These teachers became strong supporters for the adoption of the *EM* program. In 2002–2003 the School City of Hammond joined the Indiana Mathematics Initiative (IMI) project. IMI is a partnership between Indiana University and nine school districts in the state of Indiana. One of the goals of the project was to work with teachers to create a leadership cadre trained to use reformed-minded mathematics practices in their classrooms. The teachers and the school districts in the project chose to pilot *Everyday Mathematics*, and IMI officially began providing professional development for participating teachers on using reform-minded curricula and practices in elementary school. In the first phase, only select teachers in Grades 2 and 5 were chosen for the IMI training. Later, teachers in grades 3 and 4 were added. Finally, pre-k, kindergarten, and first-grade teachers joined the IMI program. The teachers selected for the additional training were math leaders within their buildings. It was the responsibility of these teachers to share with their grade levels, through staff development opportunities, the information gained at the IMI training sessions. Several of these same teachers also served with their colleagues on the Math Textbook Adoption Committee.

The Hammond School System adopted *Everyday Mathematics*, the University of Chicago School Mathematics Project, in the spring of 2004 for the school year 2004–2005. This program is standards-based, and, as such, introduced teachers and students to a totally different approach to the teaching and learning of mathematics than had previously been used in the school system.

*Everyday Mathematics* is a spiraling program that allows math skills to be developed more fully as children move from one grade to another. Student progress is evaluated by how well the child understands the mathematical concepts.

Teachers no longer were the dispensers of mathematical information. Students were now active participants in their own learning. This type of instruction required classroom teachers to change not only their method of teaching math, but also the manner in which they evaluated student progress. It became necessary to rethink using only paper and pencil tests to evaluate student growth.

Children using the standards-based curriculum soon recognized that mathematics is not just following a set procedure, but rather a way of thinking. As teachers and children shared their thinking processes to find solutions to math problems, students came to realize that mathematical problems could be solved in more than one way. The use of games, discussions, observations, explorations, and other class activities as part of the evaluation process provided teachers with the opportunity to view each student's algorithmic and procedural thinking. These activities, if used for assessment, would give a much clearer picture of students' growth and understanding. However, when the IMI project began, teachers were unfamiliar with these evaluation opportunities and consequently few of them used these activities to assess student progress.

Teachers using a reform-minded program for the first time diligently prepared for the daily lessons. They followed the directions given in the manuals, and each lesson was taught exactly as directed. The journal pages were completed and checked. Games were played at least once a week, and the homework was assigned and reviewed daily. Then the teachers faced the task of assessing student progress.

### **Uncertainty about the Role of Assessment**

At the end of each chapter the text provides different assessments. Some asked students to provide individual responses to teacher-directed tasks, and answers could be oral or written. Others were paper-and-pencil tests that assessed the concepts presented in the chapter. Children were expected to be at different levels of understanding for different concepts.

Teachers soon discovered they were unsure how to use the tests provided at the end of each unit to determine the level of development for a child's progress. The teachers who piloted the program had been given the suggestion from the Indiana Mathematics Initiative trainers to assign different numbers of points to each question based on the level of the skill. This tip was shared among the teachers, but it proved to be a cumbersome way to evaluate progress and not a true indicator for the mastery of skills. The frustration of the teachers grew, as they struggled to find ways to more accurately assess individual progress.

The Indiana Mathematics Initiative (IMI) continued to provide regular training sessions that allowed members to interact with other teachers in Indiana school districts and share their mathematical experiences and frustrations. This continued training was offered to a small group of teachers during the 2004–2005 school year. These teachers became known as the "Select Cadre." In Hammond one teacher from each grade level in the system was selected by the Chief Administrator for Academic Services to become part of the core team that would attend the IMI select cadre meetings. Those teachers attended three or four yearly IMI training sessions and then shared the knowledge gained at the meetings with the other teachers in the District.

In these IMI training sessions, teachers from school districts throughout the state of Indiana met to discuss how the implementation of reform-minded curricula was working in their districts. Assessment was what caused educators the most difficulty. As the dialogue between the assembled teachers grew, it became obvious that there were many assessment opportunities embedded in the curricula being used. However, most teachers using these programs did not use the assessment materials, much less understand how to utilize the ongoing assessment

opportunities. They did not understand that games, oral answers, products, exit slips, classroom observation, and informal assessments could be used to determine students' progress and understanding. Few teachers realized that assessments could be only one problem and did not have to be a paper and pencil activity. The thought process had to change, since assessments need to match the way the children learned.

Good teachers understand that assessment can be done in a variety of ways, and learning should not just be measured in only one form. Yet, too many teachers relied solely on the formal assessment because it was in the text and followed a familiar format. What's more, they didn't know what other assessments to use or where to locate them.

### **Supporting Teachers in Their Use of Alternative Assessments**

The Indiana Mathematics Initiative provided several workshop sessions for the select cadre members to focus on the concerns about assessments. Select cadre teachers gathered in grade-level groups to go through the curriculum materials to find opportunities to evaluate the goals taught in each chapter. Then the groups shared what their grade level had discovered. This was a good beginning, but this information needed to be organized in a manner that was easy to use.

During the first year the standards-based curriculum series was implemented, the Hammond select cadre members conducted a workshop for the building math leaders that focused on assessment. This provided an opportunity for the selected math teachers to decide, by grade level, when the different skill levels had been attained and how this was to be determined. They also made lists of what activities they used or could use to make this evaluation. (See Appendix 1 for the survey and results of the November 16, 2004 workshop.) This was the first step in the development of the "Assessment Opportunities Embedded in the Program" project.

The teachers, selected in school year 2004–2005 to work on compiling unit assessment opportunities for each goal, were a representation of district teacher leaders from grade levels 1–5 who were considered math leaders at their grade level, along with the cadre members. These teachers were given released time to meet during the school day. Their first task was to look at the goals for each unit at their grade level and find the opportunities within the program to assess that goal. Each grade level had a template to complete with the goal, expected level of achievement, Indiana Academic Standard, the mathematics content strand, and the various assessment opportunities offered by the components of the program. Once these were identified, the first drafts were completed. Later these same teachers worked several days during the summer that same year to revise these drafts so the same format was used at all grade levels. This assessment piece was a work-in-progress, and was revised each year. The last revision was in 2008. The substitute teachers hired to release educators to meet during the school day for this project, as well as the stipends paid to the teachers who worked on the revisions during the summer, were funded through IMI.

As the selected teachers developed the assessment guide, their appreciation for the many assessment opportunities available grew. It was suggested that the process of finding the alternative assessment opportunities embedded in the program be incorporated into part of the new teacher training. New teachers would then have the opportunity to become familiar with the manual, as well as discover the various methods of evaluating student progress using alternative assessments to determine if the goals are met. The title of "*Everyday Mathematics* Assessment Opportunities Embedded in the Program" was chosen for the assessment guide being developed by the School City of Hammond educators, so teachers would not feel they had to use all the assessments given in this guide.

This information was placed on a CD and shared with IMI cadre members in Indianapolis in 2005. Hammond teachers also shared with their colleagues at the IMI meeting how this assessment tool was developed. With this assessment opportunity guide, grade-level teams or

individual teachers could select the opportunities to be used for evaluation, group the activities according to the goals being evaluated, and record student progress based on these varied assessments. This helped teachers organize the student math products for reporting progress to parents and administrators. (A sample page for Assessment of Secure Goals developed by a second-grade teacher can be found in Appendix 2.)

Select cadre members, as part of their training, had the opportunity to reflect upon their students' progress as they completed the required logs for the Indiana Mathematics Initiative program. Those teachers were required to create rubrics for each unit goal and describe how students at different levels would perform. Then the cadre teacher would analyze their students' progress and create a plan to help each child improve. Teachers reflected upon the strengths and weaknesses of their instruction, and each educator looked for ways he or she could strengthen instruction and improve the learning opportunities the children experienced. These teachers discovered, through the reflection process, how rich the program is in assessment opportunities. They also developed a better understanding of their students' progress in internalizing the math skills taught in each unit.

The desire to have other teachers in the district share this experience was the idea behind grade-level math cadre teachers working together to organize a reflection component to go along with the "EM Assessment Opportunities" that would be added at a later date. Once the alternative assessment opportunities were being used by the teachers to evaluate the progress of their students, the School City of Hammond, in 2005–2006, added this reflection component, which was similar to the logs completed by the select cadre members. The reflections were done individually first and then compiled by grade levels at the grade-level team meetings. Grade-level dialogues supported and encouraged teachers as they worked to develop ways to help their students strengthen their math skills. It also ensured grade-level consistency in reporting student progress within the district. The information was first shared with the building principal who responded to the reflections before the grade-level scores were sent to the Central Office for the School City of Hammond. (For more information see "District Assessment and Reflection Logs" by Julie Pearson. (<http://www.indiana.edu/~iucme/perspectives/35pearson.pdf>) )

### **Next Steps**

In February and again in June 2008, the teachers involved in preparing this document met to complete the "Assessment Opportunities" project, to check for accuracy, and to decide whether or not the finished product had remained true to the philosophies of the *Everyday Mathematics* program. They also determined how to best share this information and monitor its use within the school system. This new, revised "Assessment Opportunities" work completed by the Hammond teachers will be shared during a district-wide workshop held near the beginning of the 2008–2009 school year, when it will be reviewed and discussed at each grade level. This document will also be on the School City of Hammond web site. (The latest version of "Everyday Mathematics Assessment Opportunities" for third grade can be found in Appendix 3.)

The development of the assessment component has taken place over several years. Many educators have had an active role in completing this project, and each teacher who has worked to develop or revise the "Assessment Opportunities" paper has personally grown in her/his understanding of using a reform-minded curriculum as well as in the many ways to evaluate student progress.

*Contact info:* Lois Huntington  
School City of Hammond



ASSESSING STUDENTS IN EVERYDAY MATH

Attached are the responses of teachers to a series of questions focused on Assessment in Everyday Math. These responses were gathered on November 16, 2004.

The questions were:

1. How do you decide if a student has attained the level of B, B/D, D, D/S, or S in an EM Unit?
2. What assessments are you using to determine the level of B, B/D, D, D/S, or S?
3. If you give grades, how do you determine these for a progress report or report card?
4. How are you reporting progress to parents?

**EM Assessment**

**Grade 2**

1. **Subjectivity:** easy to pick out students who are clueless and those that are totally secure. It is difficult to decide about those in the middle.

Beginning: Struggles, no understanding

Beginning/Developing: Little understanding easily confused

Developing: Always get some things right / can fix it with little support

Developing/Secure: Almost there – right most of the time

Secure: Understands in any form, nearly

2. To assess could use: Journals, Checking Progress, slates, teacher created test, Exit Slips, Worksheet Builder, oral assessments, observation, games, teacher assessment center
3. To assess could use: Math Boxes, Skills Links, weight the Checking Progress, Math Boxes on Secure goals only, teacher-created tests, weekly quizzes
4. Report progress to parents by: Individual Profile of Progress, Report Cards, Progress Reports, "Making the Grade" computer Program Report, teacher-created program Report, conferences, phone calls.



Everyday Math Assessment Opportunities Embedded in the Program

Grade 3 Unit 1  
 MMR=Mental Math Reflexes TE=Teacher's Edition JP=Journal Page HL=Homelinks

Goal	Level	EM Learning Goal	Math Msg	MMR	Journal	Math Box	End of Unit Assessments	Games and HL	Other
		<i>Indiana Standard</i>	Lesson/TE Page	Lesson/TE Page	Lesson/JP	Lesson/JP/Cell #		Lesson/TE Page	
1a	D/S	Identify and use number patterns to solve problems.  <i>Problem Solving 3.6.1</i>	(1.11)p.67	(1.10)p.61 (1.11)p.67	(1.7)p.11 (1.11)p.21	(1.5)p.5#2 (1.7)p.12#2 (1.9)p.17#2 (1.12)p.25#6	Written #1-3, 13, 14	(1.7)p. 48 HL (1.8)p. 52 Beat the Calculator (1.11)p.70 HL	(1.11)Masters p.11
1b	S	Count by 10s and 100s.  <i>Number Sense 3.1.1.</i>	(1.2)p.21	(1.2)p.21 (1.5)p.35 (1.7)p.45		(1.5)p.5#3 (1.6)p.9#5 (1.9)p.17#3 (1.7)p.12#3 (1.11)p.24#3.	Oral #1-4 Slate #4 Written #7,8,13	(1.2)p.24 HL	
1c	D/S	Apply place-value concepts in four digit numbers.  <i>Number Sense 3.1.2</i>		(1.5)p.35		(1.6)p.9#2 (1.8)p.14#2 (1.12)p.25#2	Slate #1, 2, 4 Written #8,9	(1.3)p.29 HL (1.8)p.53 HL	(1.5)Masters p.6
1d	D/S	Tell and show times to nearest minute.  <i>Measurement 3.5.10, 3.5.11</i>	(1.3)p.26 (1.12)p.72	(1.4)p.31 (1.6)p.41 (1.12)p.72	(1.12)p.26	(1.5)p.5#5 (1.7)p.12#5 (1.9)p.17#5 (1.11)p.24#5	Slate #6 Written #10-12	(1.4)p.33 HL (1.12)p.75 HL	(1.4)Masters p.4 (1.12)Masters p.13

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Grade 3 Unit 1  
 MMR=Mental Math Reflexes TE=Teacher's Edition JP=Journal Page HL=Homelinks

Goal	Level	EM Learning Goal	Math Msg	MMR	Journal	Math Box	End of Unit Assessments	Games, H.L./S.L.	Other
1e	D/S	Calculate the values of combinations of bills and coins and write the total in dollars and cents notation.  <i>Computation</i> 3.5.10, 3.5.11	(1.9)p.55 (1.10)p.61	(1.9)p.55	(1.9)p.15 (1.10)p.18	(1.10)p.20#3 (1.12)p.25#3	Oral #5 Written #4,5	(1.9)p.58 HL (1.9)p.59 Buyer and Vendor (1.10)p.58 HL	
1f	S	Find equivalent names for numbers.  <i>Number Sense</i> <i>Computation</i> 3.1.3, 3.1.4, 3.2.4, 2.1.3			(1.6)p.8		Slate #5 Written #6, 15	(1.6)p.42 Name That Number (1.6)p.43 HL	
1h	S	Know addition facts.  <i>Computation</i> 2.2.1	(1.6)p.41		(1.11)p.23	(1.5)p.5#6 (1.6)p.9#6 (1.7)p.12#6 (1.8)p.14#6 (1.11)p.24#6	Written #15	(1.3)p.28 Less Than You (1.4)p.33 Addition Top-It Bear The Calculator	