Special congratulations to the 2005 "Ontario Mathematics Educators of the Year":

1. The Union Gas Award for Teaching Excellence in Mathematics (elementary), awarded to **Felicity Laudisa, Toronto DSB**
2. The Union Gas Award for Teaching Excellence in Mathematics (secondary) awarded to **Ron Gaudreau, Ottawa-Carleton DSB**
3. The Union Gas Award for Outstanding Leadership in Mathematics Education awarded to **Anna Jupp, Toronto DSB**

OAME would like to congratulate all the teacher-leaders who have been nominated over the past three years for this special award, sponsored by Union Gas. They are all deserving of recognition as outstanding mathematics teachers and/or leaders.

Special congratulations to the following Ontario educators who were nominated by their boards in 2005.

ELEMENTARY NOMINEES	
Bruce-Grey CDSB	Tim Broughton
Hamilton-Wentworth DSB	Rick Kaszas
Ottawa-Carleton DSB	Heather Lawson
Toronto DSB	Felicity Laudisa
Waterloo Region DSB	Mary Forbes Christine MacTavish
SECONDARY NOMINEES	
Halton DSB	Amy Lin
Ottawa-Carleton DSB	Ron Gaudreau
Superior-Greenstone DSB	Karen Saarimaki
Toronto DSB	Dr Kathir Brabaharan
LEADERSHIP NOMINEE	
CSDEC du Sud-Ouest	Paul Lachance
Ottawa-Carleton DSB	Ron Gaudreau
Toronto DSB	Anna Jupp
Waterloo Region DSB	Keith Baumann

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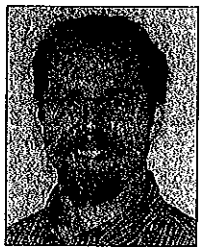
▲ Making Effective Use of Our Time: A Tracking Sheet for Daily Classroom Assessment of Student Learning

JAMIE PYPER



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> *"Stiggins (1988) observed that classroom teachers are assessing at least 25 percent of every instructional day, but the criteria and data are usually stored in the teacher's head" (Sperling, p. 73). Sperling suggests that these criteria and observations be put on paper for everyone, especially students to see (p. 74).*

In an average semester, I have contact with about 90 students every day. What I value is continuous, consistent, clear, non-verbal communication between my students and myself, concerning general classroom expectations for effective learning, behaviour, and participation in the learning activities of the course. I have learned that repetitive verbal communication, or nagging, does not guarantee students will perform according to these expectations. Nagging tends to be unproductive and exhausting as I repeatedly implore my students to remember how to behave in the classroom: to be on time; to have all their equipment with them; to have homework done; to try to learn something; and that everything they do in class has an impact on their achievement -- even if their actions are not "for marks"!

Consequently, I developed a Tracking Sheet (see Figure 1) to use in class. It has become an integral part of my classroom practice. Each student has a personal Tracking Sheet, and together, we write on it. The visual display of classroom expectations, course expectations, and standards, reduces the amount of time I talk about these issues. Students frequently and immediately judge

STUDENT: _____ DATE: _____

GOAL: _____

MONDAY	Things done today...				Punctuality ☐ Equipment ☐ Homework ☐ Class notes ☐
	Teacher's Signature:	WI/TW	Organization	Initiative	Work Habits
TUESDAY	Things done today...				Punctuality ☐ Equipment ☐ Homework ☐ Class notes ☐
	Teacher's Signature:	WI/TW	Organization	Initiative	Work Habits
WEDNESDAY	Things done today...				Punctuality ☐ Equipment ☐ Homework ☐ Class notes ☐
	Teacher's Signature:	WI/TW	Organization	Initiative	Work Habits
THURSDAY	Things done today...				Punctuality ☐ Equipment ☐ Homework ☐ Class notes ☐
	Teacher's Signature:	WI/TW	Organization	Initiative	Work Habits
FRIDAY	Things done today...				Punctuality ☐ Equipment ☐ Homework ☐ Class notes ☐
	Teacher's Signature:	WI/TW	Organization	Initiative	Work Habits

Figure 1

their performance against the criteria (punctuality, equipment, homework, class notes, class work) listed on the page, and see any differences between their assessment and mine. This process of assessing classroom behaviours is a very collaborative effort and I can attest to Sperling's observation that "... teachers using collaborative assessment have documented extraordinary improvement with nearly all students" (p. 73).

A Connection with the NCTM Standards

In my classroom, I see a shift in emphasis from passive student attention to rules and routine problem solving, toward active student participation. As well, I see an increased sophistication of student communication about his or her learning and a reflective practice of self-assessment. For me, the NCTM Standards (2000) clearly supports this shift with what it says in its grade level sections and its Assessment Principle. Metaphorically, I think of mathematics learning and teaching as a pond, a 'math' pond, and the Standards as a set of stones thrown into the middle of the pond. The stones change the pond by adding to it, and creating ripples in the surface, and making the water move against the shore. Rather than standing on the shore and observing the ripples of the pond the Standards ask me to interact differently with the pond of mathematics learning and teaching. I am to be in the pond and collaborate in the learning and teaching of mathematics, to experience the ripples too.

The NCTM Standards' stones are *problem solving* (monitoring and reflecting), *communication*, *connections* (building to produce a coherent whole), and *representations* (organizing, recording and communicating). Interpreting the Assessment Principle with this metaphor, I, the teacher, experience the resulting ripples through an assessment process that is enhancing student learning through consistency and frequency of feedback. The Assessment Principle states that assessment should become "... a routine part of the ongoing classroom activity rather than an interruption" (NCTM Standards, 2000, p. 23). It should build a picture of individual student progress toward the goals of instruction based on identifying valuable student insights rather than concentrating on errors or misconceptions (p. 24). To accomplish this I really do need to be in the pond with my students as an *active participant* rather than standing on the shore as a passive observer.

So, How Does it Work in Class...?

I photocopy the Tracking Sheet on both sides of a piece of paper in order to get a two-week "picture" of student activity. I usually use green paper to differentiate it from regular handouts, and so it has the nickname – "the green sheet". At the beginning of the class period, students find their "green sheet" in an in/out tray on a table or counter in the room. (This tray is usually close to the door as this puts the Tracking Sheet in the students' line of sight coming in and going out of the room. It is harder to forget about the sheet this way!) Students sit down at their desks, place their Tracking Sheet on a corner of their desk and complete the punctuality, equipment and homework sections. Throughout the class, as I move about the room, I am able to immediately write a comment on the students' pages for any achievement or behaviour that should be noted.

I save a few minutes at the end of each class period so that students can make sure their Tracking Sheet is complete. As the class ends, I stand by the door to ensure no one forgets to leave the Tracking Sheet in the tray. Once everyone understands the process, it is rarely necessary for me to give reminders to leave the Tracking Sheet in the class (my students successfully continue this tracking sheet process even on those days when a supply teacher is with them). At the end of the day, I review the class sets of Tracking Sheets and sign each sheet. This review takes about five minutes of my time for each class of Tracking Sheets.

What Does this Tracking Sheet Do?

From the basic administrative function of attendance and punctuality to the collection and assessment of learning skills and course content achievement, the Tracking Sheet provides daily opportunities for positive, corrective, and informative feedback to students, and in the longer term to parents or guardians. Students and teacher together provide concrete anecdotal information regarding participation in activities and learning that occur within the class period. It has proven to help foster a sense of reflective practice and enhance students' personal growth.

For example, homework is one criterion for which I frequently add my agreement or suggestion to the students' evaluation. There is a single-row homework rubric on the wall so that everyone knows the criteria for each level of achievement. In a situation when a student copies from a friend and records a 4 for homework each day but achieves a 2 out of 15 on a Friday quiz of the weeks' homework questions, conversation resulting from this Tracking Sheet data can provide diagnostic opportunities and a chance to talk with the student

STUDENT: _____ DATE: November 8

GOAL: to bring a ruler to class

	Things done today...			
MONDAY	copyed stuff off the board	Punctuality		4
		Equipment	ruler	3
		Homework		4
		Class notes		3
	Teacher's Signature: JP	Classwork	Work in a group to get help.	4
TUESDAY	Things done today... continued on the paper we did yesterday	Punctuality		4
		Equipment	ruler	3
		Homework	not much was done on the activity over night!	4?
		Class notes		4
	Teacher's Signature: JP	Classwork		?
WEDNESDAY	Things done today... copied stuff off The board	Punctuality		4
		Equipment	ruler	3
		Homework		4
		Class notes		4
	Teacher's Signature: JP	Classwork	good participation.	4
THURSDAY	Things done today... copied stuff off the board	Punctuality		4
		Equipment	ruler	3
		Homework	at home	0
		Class notes		4
	Teacher's Signature: JP	Classwork		4
FRIDAY	Things done today... 2 couple of note on Multiplying	Punctuality	examples	3
		Equipment	ruler	3
		Homework	forgot to do it	0
		Class notes	2 polynomial by monomial	3
	Teacher's Signature: JP	Classwork	good participation, good effort	23

Figure 2

and/or his or her parent(s) about the importance of homework practice.

With this Tracking Sheet, I experience an emerging classroom environment also described by Sperling where "students can take responsibility to evaluate their own work... compare their self-assessment with the teacher's assessment, set goals for future work, and initiate corrective action to improve their own work" (p. 75).

Tracking Sheet Examples

Figure 1 is the latest version, which includes the OSS Learning Skills of Works Independently/Teamwork, Organization, Initiative, and Work habits. Figures 2 and 3 are examples of an earlier Tracking Sheet in use, and Figure 4 shows my attempt, using the earlier version, at having students write the Learning Skill for the day on the page. These pages are mechanically reproduced to make it easier to read what was handwritten.

Figure 2 provides an example of a student with a behaviour identification in combination with a cognitive learning disability, who is in a grade nine academic class. I am employing specific, long-term interventions with this student. The week shown is during a period of time when my primary focus is his participation in class and with the learning activities. On Monday, I also describe this focus for the week to the entire class and ask the students to write a goal at the top of their Tracking Sheet (notice that this student's goal for participation is to bring a ruler to class). At the end of Monday's class, I talked with the student about his participation during the period, i.e., how it could be greater than just having a ruler to use, and of the work that needed to be done for the current topic. He said he understood the day's work and would have it ready to participate more fully in class the next day. I reinforced my comments by writing in the "Classwork" section for Monday and entering a 2 over his 4 (rather than writing a 1) indicating a positive starting place. On Tuesday, there was little evidence of progress on the activity started the day before, and with little participation during the class period, the student avoided self-assessing his classwork on the Tracking Sheet. We talked again in class, and then on Wednesday and Thursday, he worked harder in class. By Friday, I thought he had improved and done very well, and so recorded a level 3 at the end of class when the student and I were able to talk and reflect on his performance throughout the week, and look ahead to the next week.

When it is not possible to speak with a student during or after a class period, the Tracking Sheet provides an opportunity for written communication. Figure 3 offers two such examples. The student in the bottom example had attempted to participate more on Thursday than she had in prior days, but was still a little hesitant to initiate a response. I wanted her to know that I noticed her engagement in the topic, and hopefully provide encouragement for future participation. The top example illustrates other communication some students may offer more regularly and comfortably in writing rather than verbally.

Short-term Options

I have used this Tracking Sheet in grade 11 and 12 (and previously in OAC) classes for up to four weeks, but usually I use it for the whole course with grade 9 and 10 students. While any classroom process has its benefits, there are times when this Tracking Sheet does not work very well. There are some students (irrespective of their level of ability) who actively resist the Tracking Sheet. In these instances I usually get two to four weeks of use with the Tracking Sheet to set the stage, identify my classroom expectations and collect some assessment data. Then I stop using it in class. As with any classroom learning or management strategy that is not as effective as I had hoped, another strategy is implemented.

Changing the Classroom Learning Environment

For me, classroom management, assessment, instruction, and learning activities are interrelated parts of the educational experience. To improve on one part requires awareness and possibly re-alignment of the other parts "since all aspects of a system are interlocking, [and] all parts must change in accordance with the new paradigm" (Costa, p. 50).

I have used various forms of this Tracking Sheet for years, through two other secondary school mathematics curriculums. Over time, my teaching style has changed, as have my classroom assessment strategies. This Tracking Sheet is a re-alignment of assessment practices to respond to the changing environment and culture of mathematics learning. Stigler & Hiebert (1999) confirm there is a school culture, and that cultural changes evolve over time. The latest curriculum reform has had a greater influence on the culture of my math classroom. It feels like there is so much more to keep track of, and to report, with respect to my students' learning. Even if I can keep all the information in my head, no-one else can see it, so, like Sperling, I am putting it down on paper and making my students collaborators in learning.

STUDENT: _____ **DATE:** November 15

GOAL: To participate more in group discussions

MONDAY	**Things done today...** - discussed homework in groups	**Punctuality**	
	- homework check (by teacher)	**Equipment**	
	- Quiz *What happens on quizzes? You do so well on tests... can you identify what happens to you?*	**Homework** - from Thursday (Absent): 4/4 - from Friday's class : 3/4	4
	- factoring note and work	**Class notes**	4
	Teacher's Signature: JP	**Classwork**	3
TUESDAY	**Things done today...** Homework discussion	**Punctuality**	
	Quiz retake - I find that I do better on tests when I have more time to do them. I got almost perfect the second time.	**Equipment**	
	Give back exams.	**Homework**	4
	Class work time	**Class notes** I can't concentrate when someone's telling me I have 30 seconds to finish.	n/a
	Teacher's Signature: JP	**Classwork**	3
WE	**Things done today...**	**Punctuality**	

Above sample is a sample from a grade 9 Academic student.

Below is a sample from a grade 9 Applied student

THURSDAY	**Things done today...** *Wrote down question*	**Punctuality**	✓
	Took up homework	**Equipment**	✓
		Homework	4
		Class notes *good*	3
	Teacher's Signature: JP	**Classwork** *I could see that you were ready to answer*	23
FRIDAY	**Things done today...** *Took up homework*	**Punctuality** *& I went on to other things before you could volunteer*	✓
	questions	**Equipment**	✓
		Homework	4
		Class notes	3
	Teacher's Signature: JP	**Classwork**	3

Figure 3

STUDENT: _____ **DATE:** November 1

GOAL: To do something about my headaches, I think I need glasses in class

MONDAY	**Things done today...** We reviewed work. And looked how slope connets with the stuff we're doing now	**Punctuality**	✓
		Equipment	✓
		Homework	4
		Class notes	4
	Teacher's Signature: JP	**Classwork** ✶Initiative✶	3
TUESDAY	**Things done today...** We had a work time, Got what we would do for Midterms. Mid-term review.	**Punctuality**	✓
		Equipment	✓
		Homework	4
		Class notes	4
	Teacher's Signature: JP	**Classwork** ✶work habits✶	4
WEDNESDAY	**Things done today...** I was at take your kids to work day. The office has the note.	**Punctuality**	
		Equipment	
		Homework Absent	
		Class notes	
	Teacher's Signature:	**Classwork**	
THURSDAY	**Things done today...** I fixed this sheet. We looked at distributive properties.	**Punctuality**	✓
		Equipment	✓
		Homework	4
		Class notes	4
	Teacher's Signature: JP	**Classwork** ✶work habits✶	4
FRIDAY	**Things done today...** Today, before class I got my table of contents up to date. We looked at poly Nomials.	**Punctuality**	✓
		Equipment	✓
		Homework	4
		Class notes	4
	Teacher's Signature: JP	**Classwork** ✶Organization✶	4

Figure 4

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▲ Using Technology in the Junior Grades

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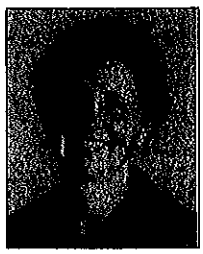

Dr. Margaret Sinclair is an Assistant Professor in the Faculty of Education at York University. She brings to this work almost twenty years of experience as an elementary and secondary classroom teacher and a secondary administrator. Her research focuses on the use of technology in elementary and secondary school mathematics, and on the use and design of mathematics learning objects. Dr. Sinclair recently served as a member of the Ontario Ministry of Education's Expert Panel on Mathematics in the Junior Division.

What's all the hype about using technology in math? Does it make a difference? Should we bother in the junior grades? Is it worth the effort?

Tim Granger thinks it's worth it (Granger, 2000). His fifth grade students used TesselMania! ("TesselMania! Deluxe," 1997) to produce computer-generated tessellations then ironed their creations onto t-shirts. He noted, "As it prompted their exploration into patterns, symmetry, and spatial reasoning, the project opened students' eyes to the beauty of mathematics" (p. 13). Robert Berry III and Joyce Wiggins (Berry III & Wiggins, 2001), who carried out an angle measurement unit with a group of grade 6's, also think it's worth it. Their students used home-made protractors to measure the interior angles of three-, four-, five- and six-sided polygons, then worked with *The Geometer's Sketchpad* on three activities involving measuring and estimating angles. Berry III and Wiggins noted that the students "increased their repertoire of benchmark angles" (p. 156), which helped them make reasonable estimates of angle size. Both these projects illustrate what research has shown – that the appropriate and integrated use of technology can produce measurable gains in learning (Jones, 2002; Ruthven, 1999).

Technology is already important to our junior students - many use it on a daily basis. They surf the internet to find information, upload, download and edit digital photos and graphics, use word processing software to prepare assignments, and talk to one another via email and chat.