

Applications of Progress Monitoring to IEP and Program Development

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and

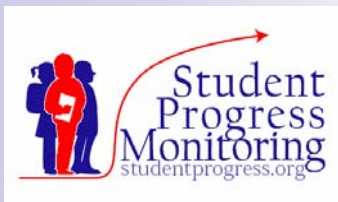
Michelle Hosp

University of Utah

CEC 2005

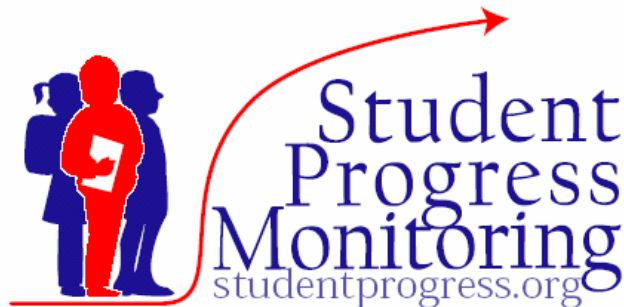
Annual Conference and Expo

Baltimore, Maryland



This session is part of a presentation strand sponsored by the National Center on Student Progress Monitoring

- Web site: www.studentprogress.org
- E-mail: studentprogress@air.org





Overview

- Defining Progress Monitoring and Curriculum-Based Measurement
- Conducting Curriculum-Based Measurement in Mathematics and Reading
- Using Curriculum-Based Measurement Data to Develop IEPs
- Using Curriculum-Based Measurement Data to Strengthen Instructional Planning




Defining Student Progress Monitoring

Progress monitoring involves ongoing data collection on skills that are important to student success

- to estimate student rates of improvement and
- to identify students who are not demonstrating adequate progress

in order to alter instructional variables to better meet the needs of individual students.


Thus, teachers may use progress monitoring to design more effective, individualized instructional programs for struggling learners.



What Are Differences Between Traditional Assessments and Student Progress Monitoring?

■ Traditional Assessments:

- Tests typically are lengthy.
- Tests are administered on an infrequent basis.
- Teachers do not receive immediate feedback, and feedback may not inform instructional planning.
- Student scores are based on national scores and averages.



What Are Differences Between Traditional Assessments and Student Progress Monitoring?

■ Student Progress Monitoring:

- Conducted frequently and provides an easy and quick method for gathering student performance data on important, grade-level skills/content.
- Analysis of student progress (performance across time) in order to modify instructional programs when needed and/or adjust student goals upward
- Comparison of data to individual student or to students in the teacher's classroom, in the child's school, or in the school district



What Is Curriculum-Based Measurement (CBM)?

CBM is a scientifically validated form of student progress monitoring that incorporates standard methods for test development and administration and for data utilization.

Key Features of CBM

- Each CBM test samples the year-long curriculum.
- CBM tests are brief and easy to administer.
- Each CBM test is different, but each form assesses the same types of skills at about the same level of difficulty.
- Teachers use CBM to monitor student progress throughout the school year by administering “probes” at regular and frequent intervals.

Key Features of CBM

- Teachers can use CBM data to quantify long- and short-term goals.
- CBM scores are graphed, and teachers may apply standard decision rules to determine whether student progress is sufficient for meeting long-term goals.
- CBM can be used to compare the effectiveness of different types of instructional interventions.
- CBM has documented reliability, validity, and instructional utility.



Conducting CBM in Mathematics

- Computation
- Concepts and Applications

Systematically samples items from the annual curriculum

Hypothetical Fourth-Grade Math Computation Curriculum

Multidigit addition with regrouping

Multidigit subtraction with regrouping

Multiplication facts, factors to 9

Multiply 2-digit numbers by a 1-digit number

Multiply 2-digit numbers by a 2-digit number

Division facts, divisors to 9

Divide 2-digit numbers by a 1-digit number

Divide 3-digit numbers by a 1-digit number

Add/subtract simple fractions, like denominators

Add/subtract whole number and mixed number

- Random numerals within problems
- Random placement of problem types on page

Taken from:

Fuchs, L. S., Hamlett, C. L., & Fuchs, D. (1998). Monitoring Basic Skills Progress: Basic Math Computation (2nd ed.) [Computer software]. Austin, TX: PRO-ED.

Sheet #1		Computation 4		
Password: ARM				
Name: _____		Date _____		
A $\frac{3}{7} - \frac{2}{7} =$	B $1\frac{6}{7} + 3 =$	C $4\overline{)6}$	D $6\overline{)78}$	E $\begin{array}{r} 875 \\ \times 7 \\ \hline \end{array}$
F $\begin{array}{r} 6 \\ \times 7 \\ \hline \end{array}$	G $\begin{array}{r} 9 \\ \times 0 \\ \hline \end{array}$	H $\begin{array}{r} 244 \\ \times 7 \\ \hline \end{array}$	I $6\overline{)48}$	J $5\overline{)20}$
K $2\overline{)50}$	L $\begin{array}{r} 6144 \\ - 4420 \\ \hline \end{array}$	M $\begin{array}{r} 33 \\ \times 10 \\ \hline \end{array}$	N $\begin{array}{r} 6 \\ \times 0 \\ \hline \end{array}$	O $7\overline{)30}$
P $\begin{array}{r} 95225 \\ + 75268 \\ \hline \end{array}$	Q $8\overline{)32}$	R $\begin{array}{r} 1156 \\ 2824 \\ + 83 \\ \hline \end{array}$	S $7\frac{4}{7} - 2 =$	T $\begin{array}{r} 38 \\ \times 33 \\ \hline \end{array}$
U $\frac{3}{5} + \frac{1}{5} =$	V $\begin{array}{r} 982 \\ - 97 \\ \hline \end{array}$	W $\begin{array}{r} 9 \\ \times 5 \\ \hline \end{array}$	X $\begin{array}{r} 4 \\ \times 1 \\ \hline \end{array}$	Y $7\overline{)56}$

Password: AIR

Name: _____ Date _____

A $9 \overline{)24}$	B $\begin{array}{r} 52852 \\ + 64708 \\ \hline \end{array}$	C $\begin{array}{r} 9 \\ \times 0 \\ \hline \end{array}$	D $4 \overline{)72}$	E $\begin{array}{r} 8285 \\ 4304 \\ + 90 \\ \hline \end{array}$
F $6 \overline{)30}$	G $\begin{array}{r} 35 \\ \times 74 \\ \hline \end{array}$	H $\begin{array}{r} 4 \\ \times 5 \\ \hline \end{array}$	I $\begin{array}{r} 7 \\ \times 9 \\ \hline \end{array}$	J $\frac{2}{3} - \frac{1}{3} =$
K $\begin{array}{r} 32 \\ \times 23 \\ \hline \end{array}$	L $\begin{array}{r} 8 \\ \times 6 \\ \hline \end{array}$	M $5 \overline{)65}$	N $6 \overline{)30}$	O $3\frac{4}{7} - 1 =$
P $\begin{array}{r} 107 \\ \times 3 \\ \hline \end{array}$	Q $2 \overline{)9}$	R $\begin{array}{r} 416 \\ - 44 \\ \hline \end{array}$	S $\frac{5}{11} + \frac{3}{11} =$	T $\begin{array}{r} 6 \\ \times 2 \\ \hline \end{array}$
U $4\frac{1}{2} + 6 =$	V $\begin{array}{r} 1504 \\ - 1441 \\ \hline \end{array}$	W $9 \overline{)81}$	X $\begin{array}{r} 130 \\ \times 7 \\ \hline \end{array}$	Y $5 \overline{)10}$

- Random numerals within problems
- Random placement of problem types on page

Taken from:




Fuchs, L. S., Hamlett, C. L., & Fuchs, D. (1998). Monitoring Basic Skills Progress: Basic Math Computation (2nd ed.) [Computer software]. Austin, TX: PRO-ED.

One page of a 3-page CBM in mathematics concepts and applications (24 total problems)

Taken from:
Fuchs, L. S., Hamlett, C. L., & Fuchs,
D. (1999). Monitoring Basic Skills
Progress: Basic Math Concepts and
Applications [Computer software].
Austin, TX: PRO-ED.

(1)

Write the letter in each blank.

- _____  (A) line segment
- _____  (B) line
- _____  (C) point
- _____ (D) ray

(2)

Look at this numbers.:

356.17

Which number is in the hundredths place? _____

(3)

Solve the problem by estimating the sum or difference to the nearest ten.

Jeff wheels his wheelchair for 33 hours a week at school and for 28 hours a week in his neighborhood. About how many hours does Jeff spend each week wheeling his wheelchair?

(4)

Write the number in each blank.

3 ten thousands, 6 hundreds, 8 ones

2 thousands, 8 hundreds, 4 tens, 6 ones

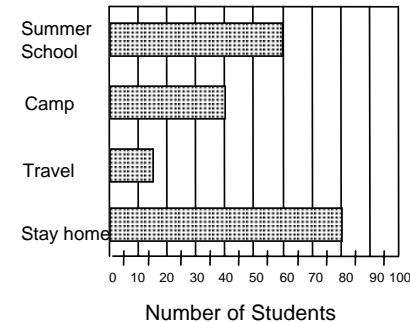
(5)

Write a number in the blank.

1 week = _____ days

(6)

Vacation Plans for Summit School Students



Use the bar graph to answer the questions.

The P.T.A. will buy a Summit School T-Shirt for each student who goes to summer school. Each shirt costs \$4.00. How much money will the P.T.A. spend on these T shirts? \$ _____ .00

How many students are planning to travel during the summer? _____

How many fewer students are planning to go to summer school than planning to stay home? _____

(7)

To measure the distance of the bus ride from school to your house you would use

- (A) meters
(B) centimeters
(C) kilometers
- _____

General Directions for Math CBM

- Give the student(s) a math sheet(s) and pencil.
- Say: “The sheet on your desk contains mathematics problems. There are several types of problems on the sheet. Some are (insert types of problems on sheet). Look at each problem carefully before you answer it. When I say, ‘please begin,’ start answering the problems. Begin with the first problem and work across the page. Then go to the next row. If you cannot answer the problem, mark an ‘X’ through it and go to the next one. If you finish a page, turn the page and continue working until I call time. Are there any questions?”

Conducting CBM in Mathematics

- Datum graphed: The number of digits (or problems) written correctly in xx minutes on mathematics problems representing the year-long curriculum
- Answers scored: May use digits correct for answers on computation probes and use problems correct on concept/applications probes
- Time allotted: Varies by grade level, but time remains constant within each grade level

Sample Allotted Times by Grade Level and Type of Probe

	<u>Computation</u>	<u>Concepts/Applications</u>
Grade 1:	2 min.	
Grade 2:	2 min.	8 min.
Grade 3:	3 min.	6 min.
Grade 4:	3 min.	6 min.
Grade 5:	5 min.	7 min.
Grade 6:	6 min.	7 min.

For Monitoring Basic Skills Progress

A “Correct Digit” Is the Right Numeral in the Right Place

$$\begin{array}{r} 4507 \\ - 2146 \\ \hline 2361 \\ \uparrow \uparrow \uparrow \uparrow \end{array}$$

4 correct
digits

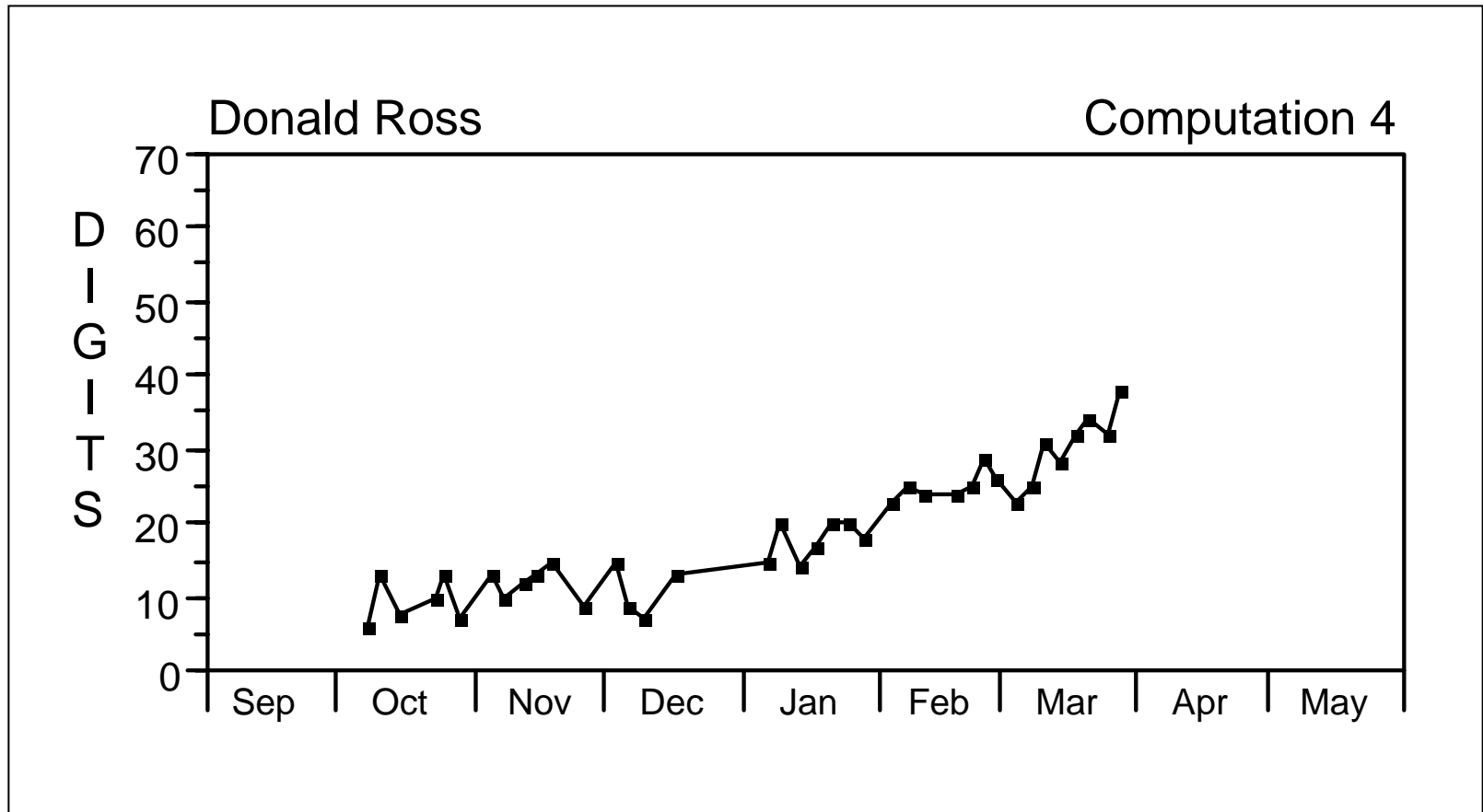
$$\begin{array}{r} 4507 \\ - 2146 \\ \hline 2461 \\ \uparrow \quad \uparrow \uparrow \end{array}$$

3 correct
digits

$$\begin{array}{r} 4507 \\ - 2146 \\ \hline 2441 \\ \uparrow \quad \uparrow \end{array}$$

2 correct
digits

Donald's Progress in Digits Correct Across the School Year





Conducting CBM in Reading

Passage Reading Fluency

Reading Maze


Tests a global behavior that simultaneously requires many skills taught in the annual curriculum.

Passage Reading Fluency

- Student is given passage in grade-level material that reflects the end-of-year goal and reads aloud for 1 minute.
- Teacher follows along on his or her own copy and marks any miscues the student makes. Teacher places a bracket after the last word read at the end of 1 minute.
- The teacher tallies the total number of words read correctly in 1 minute.

Directions for Conducting Reading CBM

- Give the student a passage to read.
- Place teacher's copy out of sight of student.
- Say to the student, "When I say 'begin,' start reading aloud at the top of the page. Read across the page. Try to read each word. If you come to a word you don't know, I'll tell it to you. Be sure to do your best reading. Do you have any questions? Begin."
- Set a digital timer for 1 minute.



Larry was very excited! His father had just brought home a new puppy. Larry's brother and sister were going to be very surprised, too.

The little puppy was black and brown with a few white patches. Her ears were long and floppy. Her tummy nearly touched the ground. Dad said this dog was a beagle.

Larry thought their new dog was cute. He couldn't decide what he wanted to name

Reading CBM Scoring Criteria

- Words read correctly are those pronounced correctly, in accordance with the context of the sentence (and the student's dialect).

Miscues:

- Mispronunciations/Word Substitutions
- Omissions
- Hesitations (over 3 seconds)
- Reversals (words not read in the correct order)

Larry was very excited! His father
had just brought home a new puppy. Larry's
brother and sister were going to be very
surprised, too.

The little puppy was black and brown
with a few white patches. Her ears were long
and floppy. Her tummy nearly touched the
ground. Dad said this dog was a beagle.

Larry thought their new dog was] cute.
He couldn't decide what he wanted to name

Reading Maze

Larry was very excited! His father had just brought home (a, on, is) new puppy. Larry's brother and sister (four, were, sad) going to be very surprised, too.

(Run, The, Keep) little puppy was black and brown (with, left, money) a few white patches. Her ears (over, desk, were) long and floppy. Her tummy nearly (orange, touched, outside) the ground. Dad said this dog (fun, boat, was) a beagle.

Larry thought their new (dog, hand, ran) was cute. He could not (decide, stores, clock) what he

How Often Should CBM Be Conducted?

- Progress Monitoring (Formative)
 - twice per week for students with disabilities
 - at least once per week for students who are at risk
 - weekly, twice monthly, or monthly for students who are average or high achieving
- Benchmarking/Screening (Summative)
 - Once per quarter for all students



Using CBM to Develop IEPs

Typical Mastery Measurement IEP

- Mastery of a series of short-term objectives
- Tests change as mastery is demonstrated
- Technical problems for quantifying progress across objectives:
 - cannot index maintenance of skills
 - unknown reliability and validity of tests
 - objectives are not equivalent “units”
 - IEP becomes unmanageable and does not meet intent of the law, that is, monitoring progress toward long-term goal



Sample Mastery Measurement IEP

■ Current Performance Level

- Student performs at grade 3 on mathematics computation.

■ Goal

- By year's end, student will increase performance by one grade level.

■ Objectives

- By 10/01, student will master addition with regrouping.
- By 12/01, student will master multiplication facts.
- By 01/15, student will master multiplication of 2-digit numbers without regrouping.



Using CBM to Write IEPs

- Eliminates focus on short-term “mastery” objectives and directs attention to monitoring student progress toward long-term goal
- Improves special education accountability and effectiveness

Typical CBM IEP

- Monitors student performance with respect to the year-end goal
- Tests remain the same--of equivalent difficulty
- Technical advantages for quantifying progress with CBM:
 - automatically indexes maintenance (and generalization) of skills
 - research demonstrates strong reliability and validity
 - scores are “equivalent” units so rate of progress can be determined
 - IEP is manageable and incorporates ambitious goal that stimulates better achievement

Writing IEP Goals (and Objectives) with CBM Data

■ Time

- “In 30 weeks...”

■ Condition

- “... given 25 problems representing the second grade curriculum, ...”

■ Learner

- “..Jose’...”

■ Behavior

- “... will write ...”

■ Criterion

- “...37 correct digits in 2 minutes.”



Setting Appropriate Goals

1. Consider normative data for typical growth rates across the year.
2. Consider level of performance appropriate for grade level.
3. CBM decision rule helps teachers know when goals should be raised. (Goals are not lowered.)

Sample IEP Statements Using CBM Mathematics Computation Data

■ Present Level of Performance:

- Given 25 problems representing grade 4 curriculum, LaKeisha currently writes 20 digits correct in 3 minutes.

■ Goal:

- In 30 weeks, given 25 problems representing grade 4 curriculum, LaKeisha will write 50 digits correct in 3 minutes. (Goal Method 1: Weekly growth rate is multiplied by number of weeks left to reach goal, and product is added to baseline. Goal Method 2: Grade-level expectations are used for mastery.)

■ Objective:

- Each week, given 25 problems representing grade 4 curriculum, LaKeisha will write 1 additional correct digit in 3 minutes.

Weekly Growth Rates for CBM Mathematics

Grade	Realistic Growth Rate	Ambitious Growth Rate
1	.3	.5
2	.3	.5
3	.3	.5
4	.70	1.15
5	.75	1.20
6	.45	1

Taken from Fuchs, L. S., Fuchs, D., Hamlett, C. L., Walz, L., & Germann, G. (1993). Formative evaluation of academic progress: How much growth can we expect? *School Psychology Review*, 22, 27-48.

Sample IEP Statements Using CBM Data for Passage Reading Fluency

■ Present Level of Performance:

- Given passages representing grade 3 material, Katy currently reads 57 words correct in 1 minute.

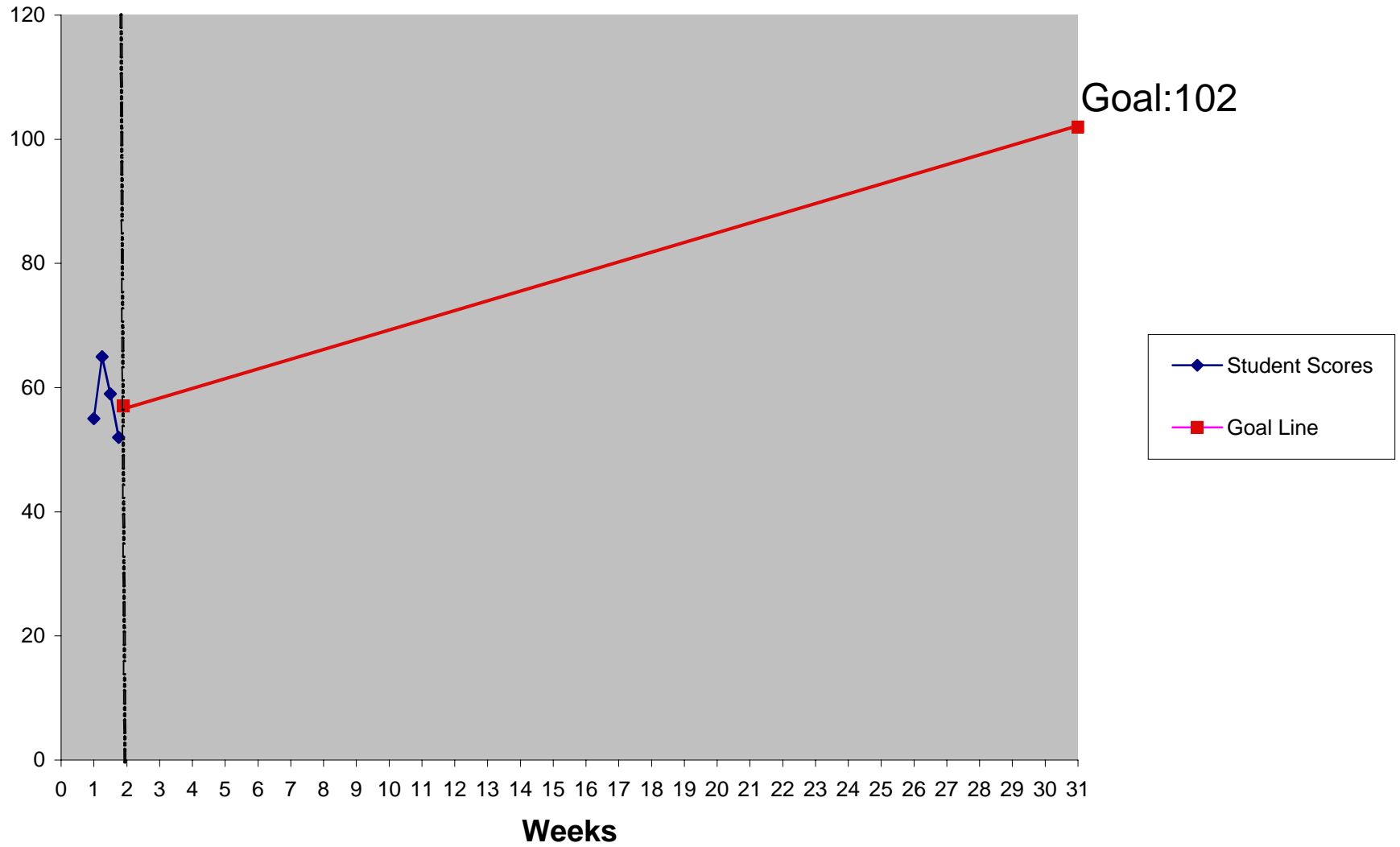
■ Goal:

- In 30 weeks, given passages representing grade 3 material, Katy will read 102 words correctly in 1 minute.

■ Objective:

- Each week, given passages representing grade 3 material, Katy will read 1.5 additional words correctly in 1 minute.

Katy



Weekly Growth Rates for CBM Passage Reading Fluency

Grade	Realistic Growth Rates	Ambitious Growth Rate
1	2	3
2	1.5	2
3	1	1.5
4	.85	1.1
5	.5	.8
6	.3	.65

Taken from Fuchs, L. S., Fuchs, D., Hamlett, C. L., Walz, L., & Germann, G. (1993). Formative evaluation of academic progress: How much growth can we expect? *School Psychology Review*, 22, 27-48.



Using CBM to Strengthen Instructional Planning



What to Examine in CBM Data

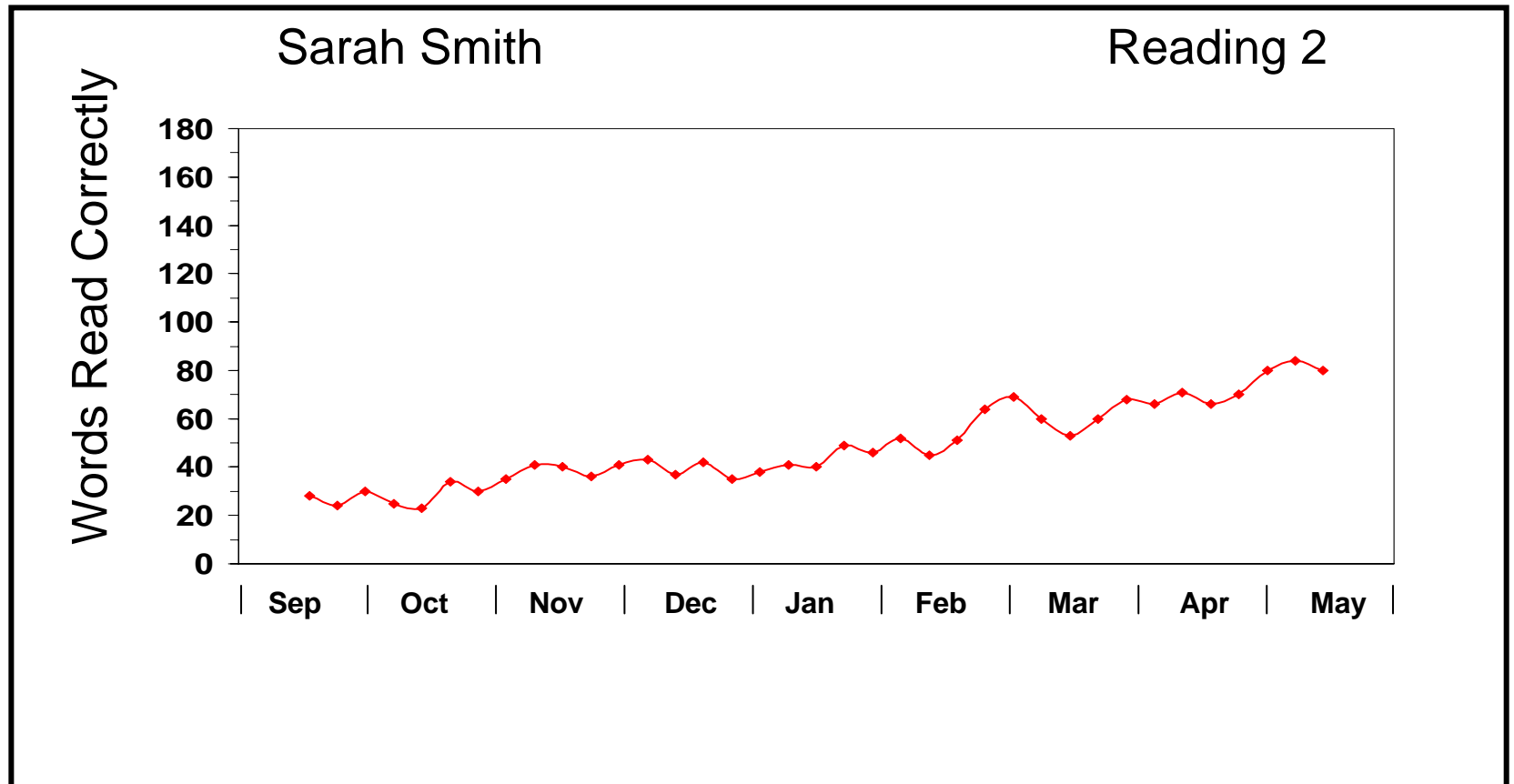
Increasing Scores:

Student is becoming a better mathematician
or a better reader.

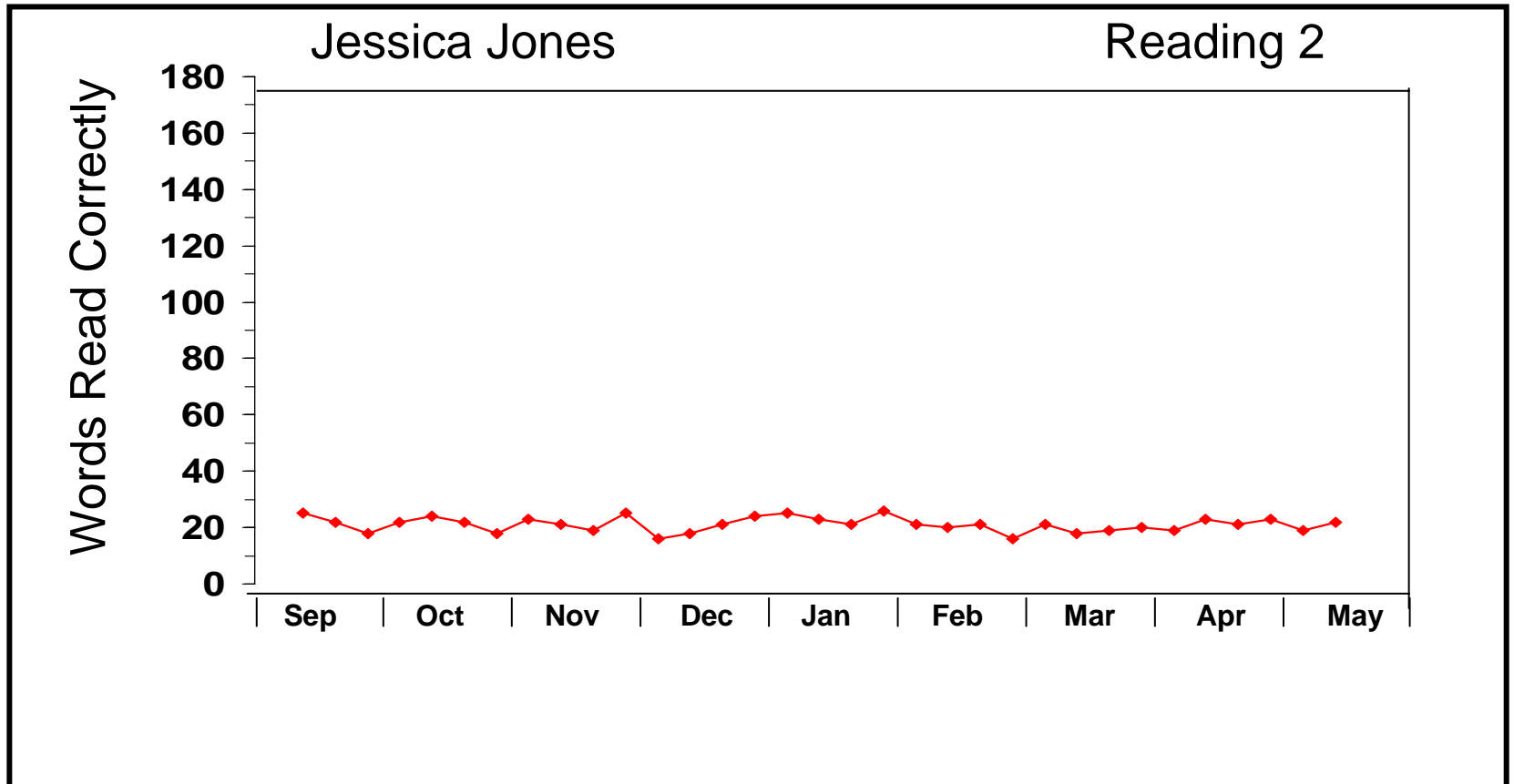
Flat/Decreasing Scores:

Student is not profiting from instruction and
requires a change in the instructional program.

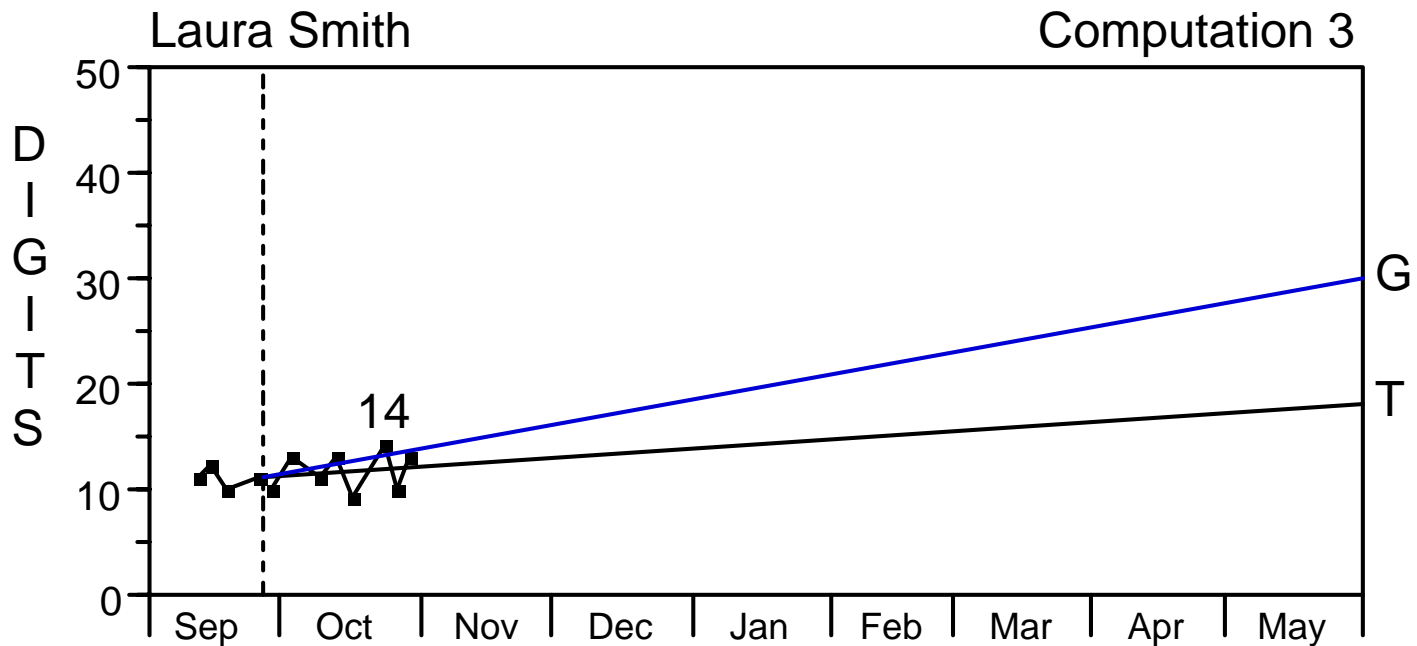
Sarah's Progress on Words Read Correctly



Jessica's Progress on Words Read Correctly



Trend of student data is less steep than goal line: Make a teaching change.

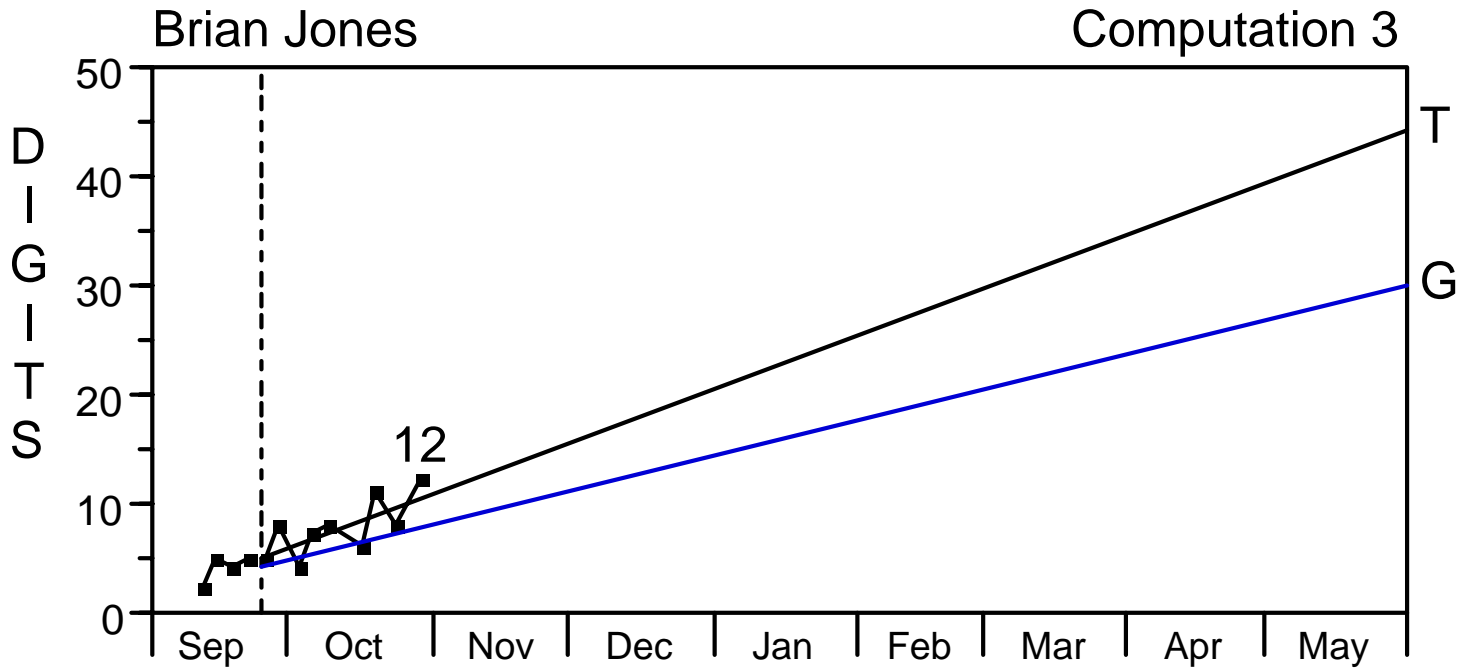


Uh-oh! Make a teaching change.

Student's rate of progress is less than the goal line.

A1					
S1					
S2					
M1					
M2					
D1					

**Trend
of
student
data is
steeper
than
goal
line:
Raise
the
goal.**



OK!! Raise the goal.

Student's rate of progress exceeds the goal line

A1					
S1					
S2					
M1					
M2					
D1					

4-Point Rule

If 3 weeks of instruction have occurred and student has at least 6 data points, examine the most recent 4 consecutive scores.

- ***If all 4 scores fall below the goal line, a change in instruction is recommended.***
- ***If all 4 scores fall above the goal line, a goal raise is recommended.***



Altering Instructional Programs

Teachers may make modifications in

- Instructional procedures and/or skills
- Instructional arrangements (teacher-student ratios; peer mediation)
- Allocated time for particular lesson components
- Instructional materials
- Motivational strategies



CBM Feedback to Students

- Motivating students to work hard
- Encouraging goal-directed behavior



Questions Students Ask Themselves about CBM Graphs

- Are my scores going up?
- What's my highest score? Can I beat it in the next 2 weeks?
- What skill(s) do I want to work hard on during the next 2 weeks to try to increase my CBM score?

For group planning, the focus is on the class report.

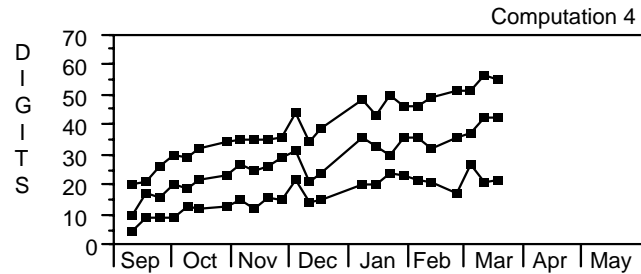
- Class graph
- Students in Bottom 25%
- Most improved across last few weeks
- Instructional recommendations

From *Monitoring Basic Skills Progress*

CLASS SUMMARY

Teacher: Mrs. Smith

Report through 3/17



Students to Watch

Jonathan Nichols
Amanda Ramirez
Anthony Jones
Erica Jernigan
Icon

Most Improved

Icon
Michael Elliott
Jonathan Nichols
Michael Sanders
Matthew Hayes

Areas of Improvement: Computation

M1 Multiplying basic facts
M2 Multiplying by 1 digit
M3 Multiplying by 2 digits
D1 Dividing basic facts

Whole Class Instruction: Computation

M3 Multiplying by 2 digits

58% of your students are either COLD or COOL on this skill.

Small Group Instruction: Computation

S1 Subtracting

Cindy Lincoln
Icon
Kaitlin Laird
Michael Elliott

Michael Sanders

**Ranked
Scores --
Average
of Last
Two
CBM
Scores
and the
Slope --
Average
Weekly
Increase**

RANKED SCORES - Computation

Teacher: Mrs. Smith

Report through 3/17

<u>Name</u>	<u>Score</u>	<u>Growth</u>
Samantha Spain _____	57 _____	+1.89
Aroun Phung _____	56 _____	+1.60
Gary McKnight _____	54 _____	+1.14
Yasmine Sallee _____	53 _____	+1.34
Kathy Taylor _____	53 _____	+1.11
Jung Lee _____	53 _____	+1.23
Matthew Hayes _____	51 _____	+1.00
Emily Waters _____	48 _____	+1.04
Charles McBride _____	43 _____	+1.12
Michael Elliott _____	42 _____	+0.83
Jenna Clover _____	42 _____	+0.78
Becca Jarrett _____	41 _____	+1.14
David Anderson _____	38 _____	+0.79
Cindy Lincoln _____	36 _____	+1.04
Kaitlin Laird _____	35 _____	+0.71
Victoria Dillard _____	34 _____	+0.64
Vicente Gonzalez _____	29 _____	+0.28
Adam Qualls _____	26 _____	+0.60
Michael Sanders _____	25 _____	+0.70
Jonathan Nichols _____	25 _____	+2.57
Amanda Ramirez _____	23 _____	+0.85
Anthony Jones _____	19 _____	+0.05
Erica Jernigan _____	18 _____	+0.23
Icon _____	0 _____	+0.00

ID of students whose progress is poor compared to peers

CLASS STATISTICS: Computation

Teacher: Mrs. Smith

Report through 3/17

Score

Average score	39.5
Standard deviation	12.6
Discrepancy criterion	26.9

Slope

Average slope	+0.98
Standard deviation	0.53
Discrepancy criterion	+0.45

Students identified with dual discrepancy criterion

	<u>Score</u>	<u>Slope</u>
Anthony Jones	19.0	+0.05
Erica Jernigan	18.0	+0.23



Upcoming Strand Session

- 1:15-3:30pm
 - Applying Progress Monitoring to RTI Prevention and Identification
 - Douglas Fuchs and Lynn Fuchs

Contact the National Center on Student Progress Monitoring

Web site: www.studentprogress.org

E-mail: studentprogress@air.org

