

Understanding Math Probes

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Understanding Assessment

Assessments can be:

- **Norm-Referenced**

- Student's results represents the student's performance compared to a large group of students of the same age or same grade

- **Criterion-Referenced**

- Student's results compared to an absolute standard to determine skill mastery

- **Curriculum-Based**

- Uses frequently administered skills probes related to curriculum of instruction
- Student's progress in curriculum monitored over time



Source: Shapiro, 1996

Curriculum Based Measures

- **What are CBM's?**
 - **Systematic procedures for the frequent and repeated collection and analysis of student performance data**
 - **Allows for the examination of student performance across time to evaluate intervention effectiveness**
 - **System to identify students at risk**
 - **Provide normative, statistically sound information for students, classes and buildings**



Source: NASP, 2006

Curriculum Based Measures

- **What does the literature say about CBM'S?**
 - **CBM use led to significantly improved achievement for students** (Baker and Good, 1995).
 - **CBM's sensitivity to small treatment gains facilitates timely instructional change** (Baker and Good, 1995)
 - **Graphing enhances treatment results** (Baker and Good, 1995).
 - **Formative evaluation involves collecting data on an ongoing basis so that an intervention's effectiveness can be determined.** (Baker and Good, 1998)



Source: NASP, 2006

Curriculum Based Measures

- **What does the literature say about CBM'S?**
 - **The objective scoring procedures used with CBM are logical and defensible...the face validity of an assessment increases when the evaluation procedure bears a logical relationship to the decision being made.** (Salvia & Ysseldyke, 1995)
 - **CBM can assist in goal-setting and goal-raising.** (Bear, Minke, & Thomas, 1997)
 - **CBM can assist students who are involved in self-monitoring, goal-setting, and decision-making regarding various aspects of their instructional program.** (Hancock, 1994)



Source: NASP, 2006

Mathematics Probes

- **In mathematics, students acquire skills related to:**
 - **Facts**
 - **Mastery of basic tools such as** > > >
 - **Strategies**
 - **Knowing how to use basic skills**
 - **Concepts**
 - **Knowing why specific skills are used**
- **Math probes can be used to monitor a student's progress in the acquisition of skills.**



Source: NASP, 2006

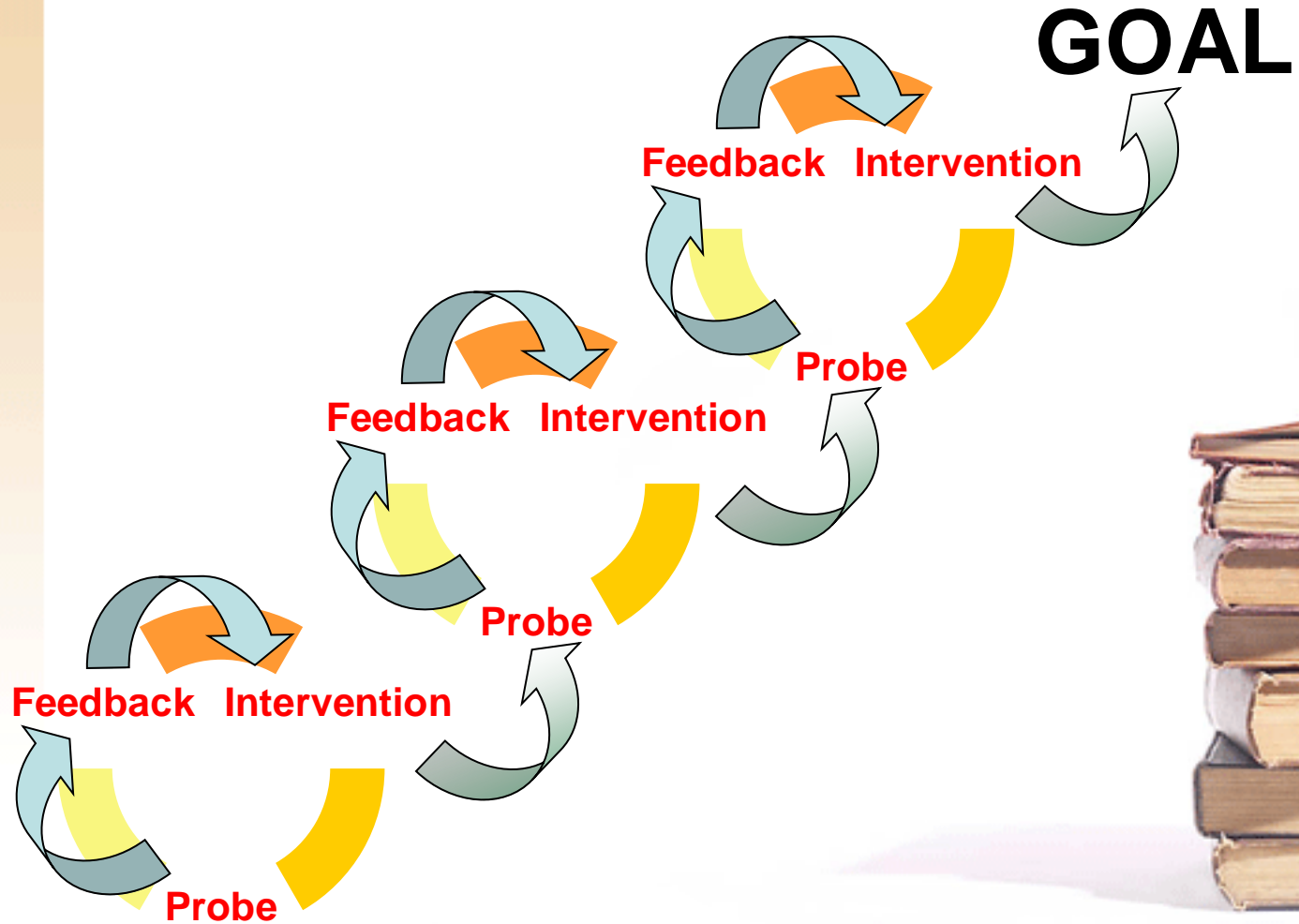
Mathematics Probes

Steps in your procedure will include:

- **The identification of a series of instructional objectives**
- **The estimation of the initial level of student functioning (baseline)**
- **The administration of individual skills probes**
- **The receipt of feedback followed by the administration of additional probes**



Mathematics Probes



Mathematics Probes

Additional Information

- **Math probes are paper and pencil tests based on the curriculum**
- **All five schools will be administered the same probes**
- **Student progress will be tracked relative to themselves as well as their peers**



Mathematics Probes

Additional Information

- **Grade progress will be tracked across schools**
- **Statistical procedures will also be used to determine the significance of individual and grade progress**
- **The general goal is to have students score 80% or better on the math probes**



Mathematics Probes

SAMPLE

MATH PROBE
(BASELINE)

CLASS: MATHEMATICS FUNDAMENTAL

NAME: _____ DATE: _____

PROBE 1: Basic Calculations

Directions: Perform the following operations.

$$\begin{array}{r} 51 \\ 17 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ 78 \\ \hline \end{array}$$

$$\begin{array}{r} 93 \\ 71 \\ \hline \end{array}$$

$$\begin{array}{r} 172 \\ 37 \\ \hline \end{array}$$

$$\begin{array}{r} 708 \\ 192 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ 3 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ 9 \\ \hline \end{array}$$

$$\begin{array}{r} 41 \\ 8 \\ \hline \end{array}$$

$$\begin{array}{r} 37 \\ 21 \\ \hline \end{array}$$

$$\begin{array}{r} 60 \\ 38 \\ \hline \end{array}$$

$$2\overline{)68}$$

$$3\overline{)97}$$

$$5\overline{)206}$$

$$9\overline{)108}$$

$$12\overline{)204}$$

$$\frac{1}{6} - \frac{5}{6} =$$

$$\frac{1}{6} - \frac{2}{3} =$$

$$\frac{7}{10} - \frac{3}{10} =$$

$$\frac{1}{2} - \frac{3}{2} =$$

$$\frac{1}{3} - \frac{4}{5} =$$



Mathematics Probes

Administering a Probe

- Provide the group of students with a pencil and the math probe. Place the probes face down on the desk in front of each student.
- Say the appropriate, specific directions to the students:



Source: NASP, 2006

Mathematics Probes

Administering a Probe

- For single-skill probes say: *“The sheets on your desk are math facts. All of the problems are (addition or subtraction or multiplication or division) facts.”*

- For multiple-skill probes say: *“The sheets on your desk are math facts. There are several types of problems on the sheets. Some are (insert types of problems included on the sheets). Look at each problem carefully before you answer it.”*



Source: NASP, 2006

Mathematics Probes

Administering a Probe

- For all probes say:

*“When I say ‘begin,’ start answering the problems. Begin with the first problem and work across the page (demonstrate by pointing). 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. Are there any questions?”
(pause)*



Source: NASP, 2006

Mathematics Probes

Administering a Probe

- Say **“Begin”** and start your stopwatch.
- Monitor students to ensure they work across the page and do not skip around or answer only specific problems.
- At the end of [2] minutes, say **“Stop. Put your pencils down.”**



Mathematics Probes

Scoring Probes

- **Math Probes are scored by considering correct digits or steps--A key is established for each probe**

$$\begin{array}{r} 1 \\ 66 \\ +75 \\ \hline 141 \end{array} \quad (3 \text{ CD})$$

Scoring Key

$$\begin{array}{r} 13 \\ 3 \overline{) 39} \\ \underline{3} \\ 09 \\ \underline{9} \\ 0 \end{array} \quad (6 \text{ CD})$$

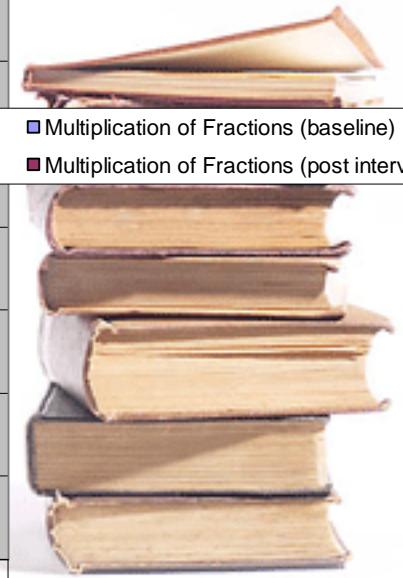
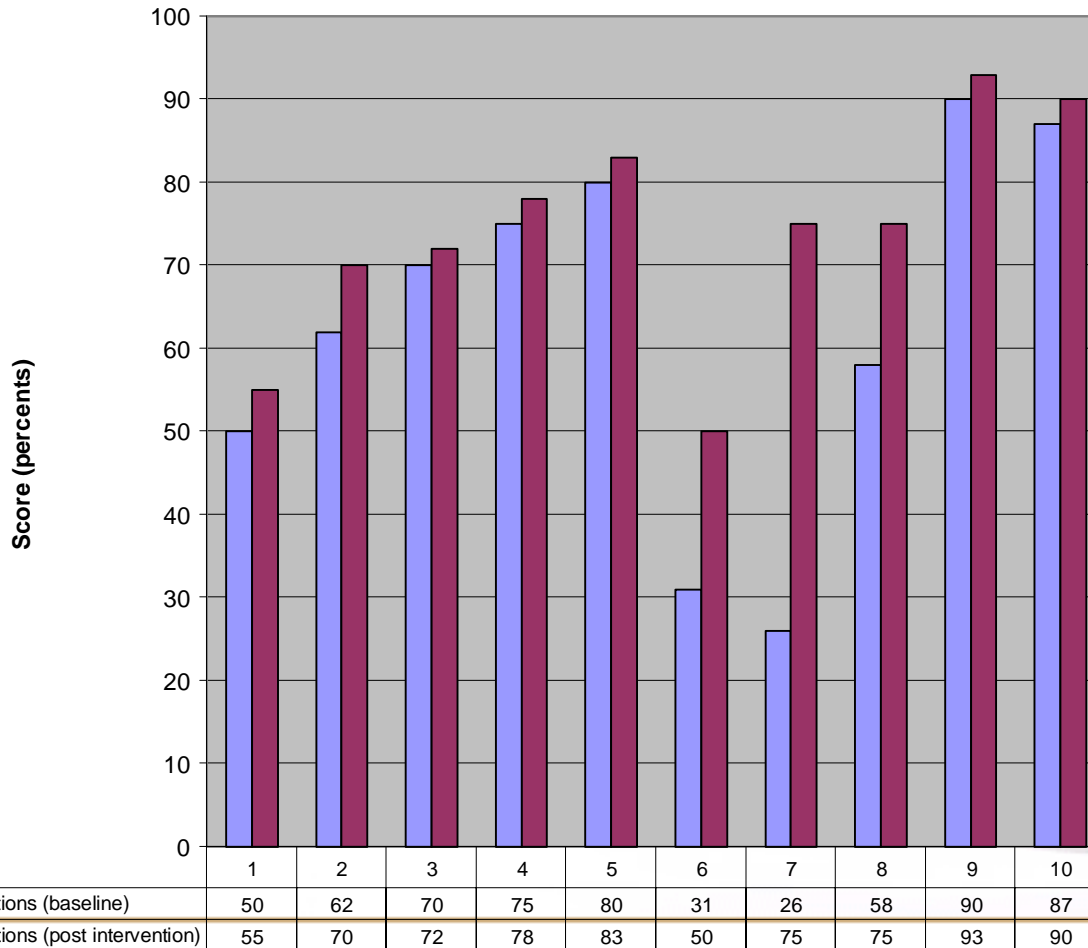
Student Response

$$\begin{array}{r} 12 \\ 3 \overline{) 39} \\ \underline{3} \\ 09 \end{array} \quad (4 \text{ CD})$$



Monitoring Progress

Pre and post Intervention
Algebraic Multiplication of Fraction Scores
(percents)

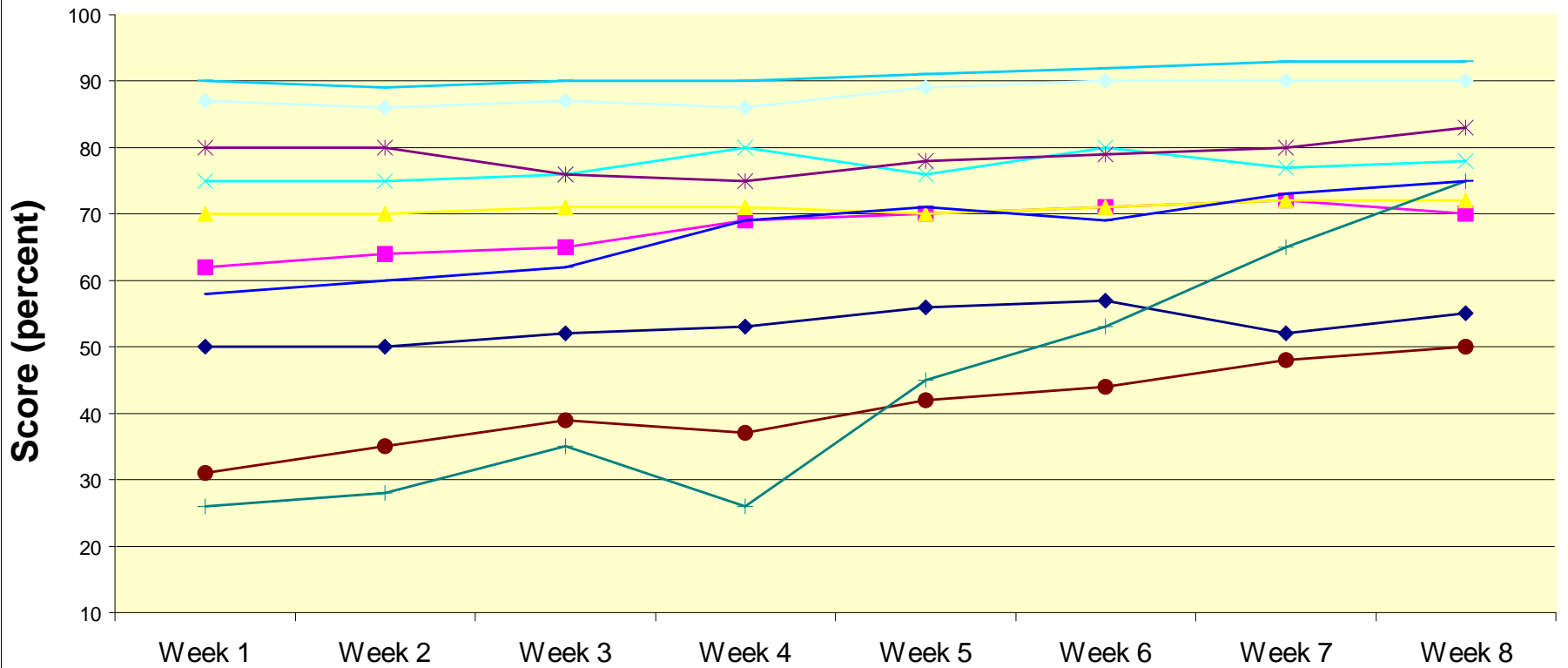


■ Multiplication of Fractions (baseline)
■ Multiplication of Fractions (post intervention)

Student

Monitoring Progress

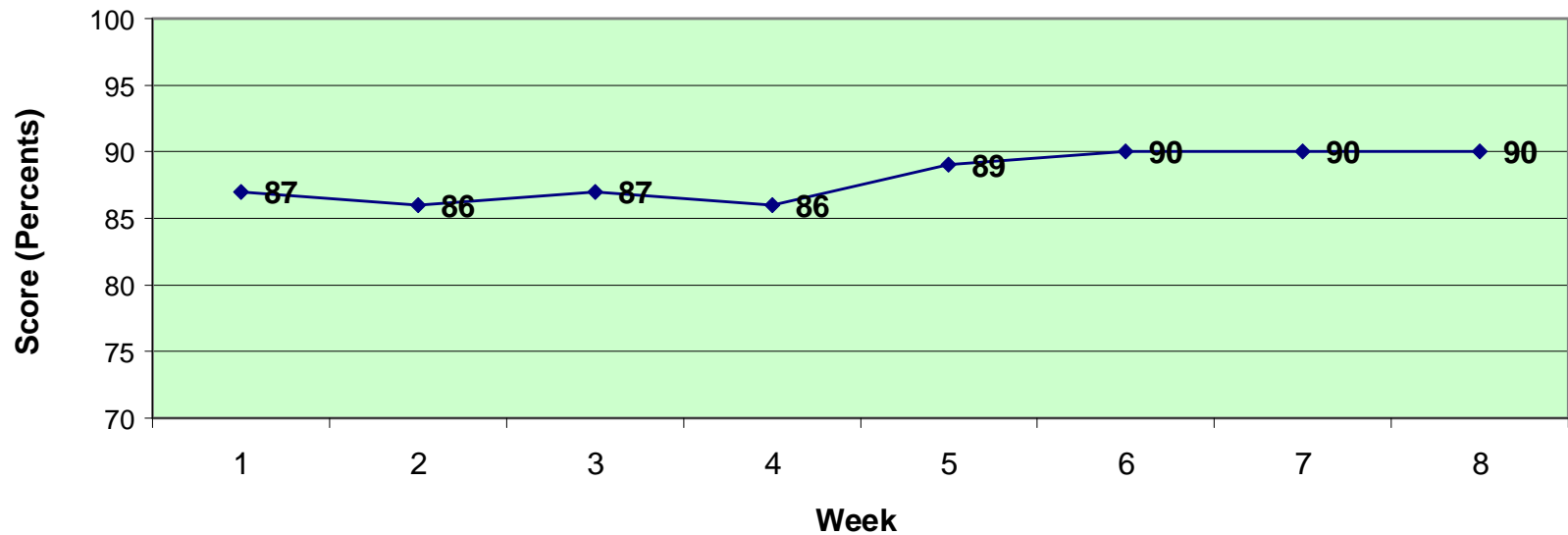
Individual Student Progress: Fractions



Mathematics Probes

Monitoring Progress

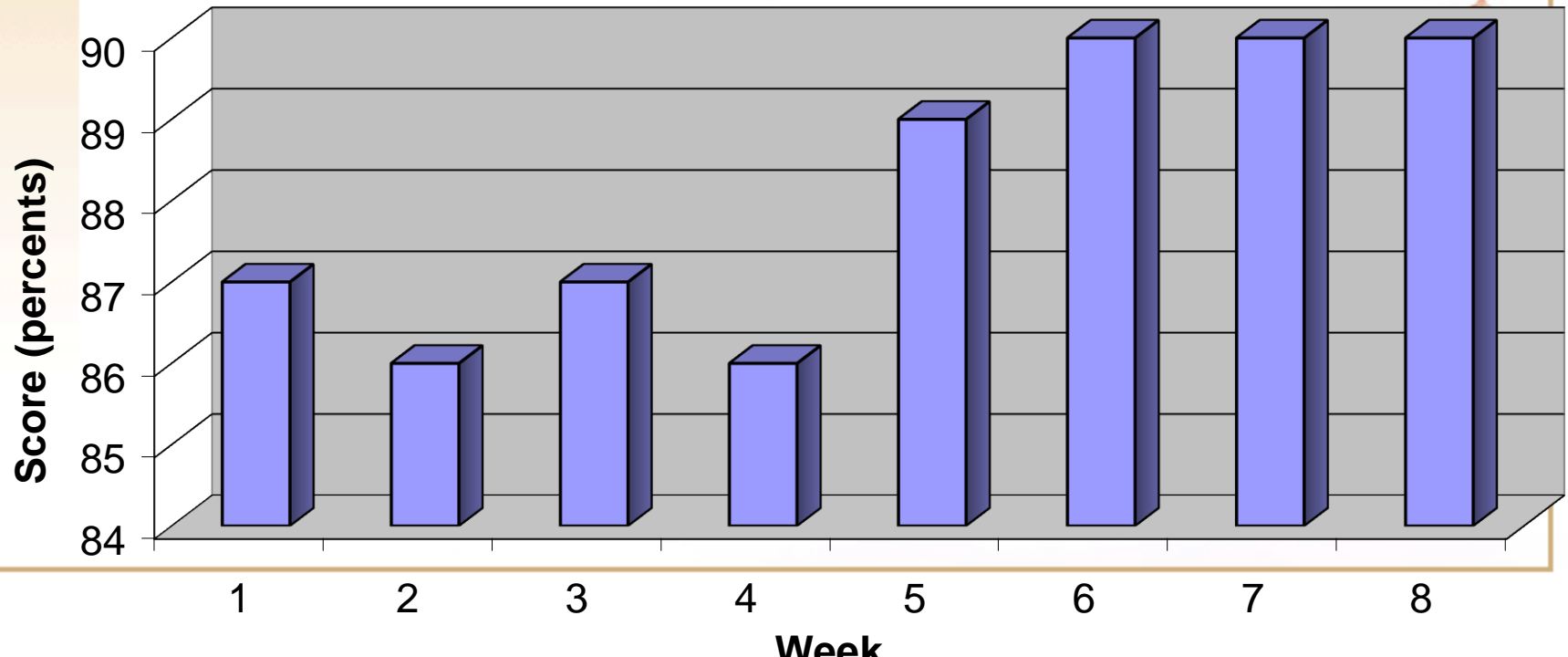
Amy's Progress: Fractions



Mathematics Probes

Monitoring Progress

Amy's Progress: Fractions



Mathematics Probes

A Final Reminder:

- The goal is to monitor student progress across schools as they progress through the curriculum.
- The hope is that teachers interpret results and implement the interventions necessary to move students towards improvement.

