Administrative Training

Components of an Effective Lesson

Teacher Expectancies

emphasizing

“5 + 1”
Superintendent’s Goals

- Increase the graduation rate
  - Credits
  - HSPE
- Decrease the dropout rate
- Increase rigor of class work
Organizing Student Learning

5 + 1

- Instruction, Concept Development-Linkage
- Note Taking
- Homework
- Test Preparation
- Assessment

Student-Teacher Relationships
My Kid Standard
Use the “5 + 1” to address student needs

- Improve instruction
- Increase student participation
- Organize & focus student learning
- Increase student achievement
Administrative Training

~ Effective Schools ~
Expectations make a difference!

“5 + 1”
Being the best!

- What does it take to be the best?
- What are you willing to do?
What are you doing to improve instruction?
What are you doing to help my child learn?
Rules in Mathematics

Don’t make sense!
Good News!

- Teachers are already employing many of the best practices needed to increase student achievement.
Best practices

- Note taking
- Homework
- Tests
Actions follow beliefs

10 simple 2-letter words
If it is to be, it is up to me
Increasing Student Achievement

No simple answer-

what works is work
Success on Success

- First Test – Important for confidence!
  - Grade Distribution
- Success on Success
  - Teach students how to learn effectively and efficiently.
    - auditory
    - visual
    - kinesthetic
  - Concentration times
Studying

- Reading
- Thinking
- Reflecting
- Organizing
- Writing
- Analyzing
- Visualizing
- Reviewing
- Remembering
- Recalling
Student-Teacher Relationships

1. Treat your students the way you want your own children treated.
2. Build success on success.
3. Talk to your students. Be friendly.
4. Talk positively to your students about their opportunity to be successful.
5. Call home early with information and good news.
6. Make testing as much a reflection of your instruction as their studying.
Student-Teacher Relationships

6. Teach your students how to study effectively and efficiently (visual, audio, kinesthetic, concentration time).

7. Tell them you like them.

8. Go over expectations explicitly and give examples.

9. Build trust, make sure they know you are there for them by telling them you are.

10. Tell them you want them to succeed.

11. Continually answer the question; “What am I doing to help my students learn?”
Students learn best when they are given feedback on their performance and praised for doing things well.
Unsuccessful Students
The Phone Conversation

• Introduction
• Pleasure teaching your son/daughter, nice young man/lady
• Explanation, how I intend to help your child succeed – Instruction
  – Clear instruction, linkage, memory aids
  – Notes, * system, very prescriptive
  – Homework, comes from notes & instruction
  – Oral recitation, procedures & formulas
  – Practice tests, * system
  – Study/flash cards
  – Reviews
The Phone Conversation

- Permission to use those strategies
- Parental help
  - Know when tests are scheduled
  - Examine student notebooks
  - Use flashcards to help study
1st Essential - Instruction
Instruction

• Teach for understanding

  – Its not a matter of *if* students will forget information, it’s a matter of when they will forget

  – Students should be able to reconstruct knowledge over time
Preparation
Creation of pre- or practice test before instruction begins suggests that teachers prepared for the unit; knowing where students traditionally experience difficulty and having resources and strategies ready to address those difficulties.
• Practice test
  • Cover curriculum appropriately (rigor)
  • Grades - Fair & Portable
  • Benchmarked
  • Unit questions reflect questions on:
    – Curriculum
    – Unit
    – HSPE
    – Semester exams
    – College Entrance exams (ACT & SAT)
Balance in mathematics has been defined as:

- Vocabulary & Notation
- Concept Development & Linkage
- Memorization of Important Facts & Procedure
- Applications
- Appropriate Use of Technology

Balance should be reflected in assessments and in the delivery of instruction.
There is no more single important factor that affects student achievement than vocabulary and notation.
Vocabulary

• Find the degree of the monomial

\[ 4x^2y^3z^5 \]
Best Bet?

– Bet A
  • Probability of winning is 3/5

– Bet B
  • Odds of winning 3 to 5
Language Acquisition

- Double meanings
  - area
  - volume
  - operation
  - power
  - mean
  - feet
  - product
Math Language Acquisition
Speaking

• Oral recitation

• Speaking

• Working in pairs (groups)
Oral Recitation

Language Acquisition

Teaches students how to learn

Embeds in short term memory
Classroom Oral Recitation

• Procedure – Adding/Subtracting Fractions

1. Find a common denominator
2. Make equivalent fractions
3. Add/Subtract numerators
4. Bring down denominator
5. Reduce
Classroom Oral Recitation

- Quadratic Formula

\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]
Stake and local school districts usually determine the classroom time available to teachers and students. However, regardless of the quantity of time allocated to classroom instruction, it is the classroom teacher and school administrator who determine the effectiveness of the time allotted.

According to a survey conducted by the American Association of School Administrators, teachers identify student discipline as the single greatest factor that decreases time on task in the classroom. Generally, teachers with well-managed classrooms, have fewer disciplinary problems. These classrooms typically have teachers who have established rules and procedures are in the classroom when the students arrive, and begin class promptly. They reduce the “wear and tear” on themselves and students by establishing procedures for make-up work, they arrange their room to accommodate their teaching philosophy and style, and they develop routines that increase overall efficiency. The benefits of establishing these classroom procedures and routines become apparent as the total time on task approaches the allocated time.
When teachers begin class immediately, students view them as better prepared, more organized and systematic in instruction, and better able to explain the material. Students also see these teachers as better classroom managers, friendlier, less punitive, more consistent and predictable, and as one who values student learning.

Routines like beginning class immediately, reviewing recently taught material, orally reciting new material, having students take notes, and ending the class by reviewing important definitions, formulas, algorithms, and the daily objective keep students engaged and on task. Quality time on task is not a “silver bullet” that can cure all the problems facing education. However, it can play an important role in increasing student achievement.
• What you teach affects student achievement

• How you teach it affects student achievement
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When will I ever use this?

• Pythagorean Theorem
• Parabola
• Circumference
Knowledge, Interest, & Enthusiasm
Use simple straightforward examples that clarify what you are teaching.

Do not get bogged down in arithmetic.
Multiplication

- by 11
- by 25
Leading the department

- Leaders make sure all department members know what and how material is assessed and what a good answer looks like.

- Leaders make sure all members teach and assess the standards on high-stakes tests.
Different Ways to Measure the Same Standard
Finding Measures of Central Tendency

1. Find the mean of the following data: 78, 74, 81, 83, and 82.

2. In Ted’s class of thirty students, the average on the math exam was 80. Andrew’s class of twenty students had an average 90. What was the mean of the two classes combined?

3. Ted’s bowling scores last week were 85, 89, and 101. What score would he have to make on his next game to have a mean of 105?
I can’t teach __________ because

my kids don’t know _______________
Show them how - Linkage

- Introduce new concepts using familiar language
- Review and reinforce
- Compare and contrast
- Teach in a different context
+  −  Polynomials
6 7 2 = 6(100) + 7(10) + 2(1)

6 \cdot 10^2 + 7 \cdot 10 + 2

6 \cdot n^2 + 7 \cdot n + 2

6x^2 + 7x + 2
\[(5 + 3)(100) + (3 + 4)(10) + (2 + 1)(1) =\]
\[(8)(100) + (7)(10) + (3)(1) =\]
\[(800) + (70) + (3) =\]
\[873\]
Addition - Left to Right

\[
\begin{array}{c c c}
412 & + & 362 & + & 213 = \\
(4 + 3 + 2)(100) & + & (1 + 6 + 1)(10) & + & (2 + 2 + 3)(1) = \\
(9)(100) & + & (8)(10) & + & (7)(1) = \\
(900) & + & (80) & + & (7) = \\
& & 987 & & \\
\end{array}
\]

\[
\begin{array}{c c c}
123 & + & 502 & + & 271 = \\
(1 + 5 + 2)(100) & + & (2 + 0 + 7)(10) & + & (3 + 2 + 1)(1) = \\
(8)(100) & + & (9)(10) & + & (6)(1) = \\
(800) & + & (90) & + & (6) = \\
& & 896 & & \\
\end{array}
\]
\[(5x^2 + 3x + 2) + (3x^2 + 4x + 1)\]

\[(5x^2 + 3x^2) + (3x + 4x) + (2 + 1)\]

\[= 8x^2 + 7x + 3\]
Add / Subtract

Rational Expressions
\[
\frac{1}{3} + \frac{1}{2} = \frac{5}{6}
\]
\[
\frac{1}{4} + \frac{1}{5} = \frac{9}{20}
\]
\[
\frac{1}{3} + \frac{1}{4} = \frac{7}{12}
\]
$\frac{1}{3} + \frac{1}{5} = \frac{8}{15}$
\[
\frac{2}{3} + \frac{1}{5} = \frac{13}{15}
\]

\[
\frac{3}{10} + \frac{2}{3} = \frac{29}{30}
\]
\[
\frac{3}{4} + \frac{1}{5} = \frac{19}{20}
\]
\[
\frac{2}{X} + \frac{3}{Y} = \frac{XY}{}\]

\[
\frac{2}{X} \times \frac{3}{Y} = \frac{2Y + 3X}{XY}
\]
\[
\begin{array}{ccc}
A & + & C \\
B & + & D \\
\hline
\end{array} = \frac{AD + BC}{BD}
\]
\[
\frac{3}{x-1} + \frac{2}{x+3} = \frac{(x-1)(x+3)}{}
\]

\[
\frac{3}{x-1} \times \frac{2}{x+3} = \frac{3(x+3) + 2(x-1)}{(x-1)(x+3)}
\]
Relations & Functions
Functions

Special relation in which no 2 ordered pairs have the same 1st element.
Menu

Hamburger .............. 4.00

Hotdog ................... 3.00

Sandwich ............... 5.00
H, 4<sup>00</sup>  \hspace{1cm} \text{Hd, 3}<sup>00</sup>  \hspace{1cm} S, 5<sup>00</sup>

H, 4<sup>00</sup>  \hspace{1cm} \text{Hd, (3}<sup>00</sup>  \hspace{1cm} S), 5<sup>00</sup>

(H, 4<sup>00</sup>)  \hspace{1cm} (\text{Hd, 3}  \hspace{1cm} (S, 5<sup>00</sup>))
## Cold Drinks

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<tr>
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<td>00</td>
</tr>
<tr>
<td>3</td>
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(1, 0.50) 
(2, 1.00) 
(3, 1.50) 
(10, ?)
\[ C = n \times 0.50 \]
\[ = 0.50n \]

or

\[ y = \frac{1}{2} x \]
(1, 0.50) (2, 1.00) (3, 1.50)

(4, 2.00) (4, 1.75)
Functions

Special relation in which no two different ordered pairs have the same 1st element.
LINKING

- Introduce using familiar language
- Review & Reinforce
- Compare & Contrast
- Teach in different context

Increased Student Achievement
Linking

- Fractions
- Decimals
- Percents
Linking

- Pythagorean Theorem
- Distance Formula
- Equation of a Circle
- Trig Identity
Linking

- Special products in algebra
- Special products in arithmetic
Linking

- Quadratic Formula
- Completing the Square
Linking

- Solving Linear Equations
- Order of Operations
- Linear equations
- Equations containing absolute value
- Radical equations
- Systems of equations
- Quadratic equations
Why Linking?

• It’s not a matter of if students are going to forget information, it’s a matter of when.
• Linking concepts will allow students to reconstruct concepts and skills
Basic Facts & Procedures

• Stopping to remember basic facts interrupts the flow of thought, which negatively impacts learning.
Memorization

• Memorizing can help students absorb and retain information on which understanding and critical thought are based.

• The more sophisticated mental operations of analysis, synthesis, and evaluation are impossible without rapid and accurate recall of bodies of specific knowledge.
It is my job to teach:

- Reading
- Writing
Reading

- Assign reading
- Explicitly introduce vocabulary & notation
- Preview reading
- Connect reading
- Check understanding of reading
- Correct their understanding
- Use paper & pencil
Organizing Student Thinking

- What’s the easiest way to help students to organize their thinking?

Writing
Writing

- Definitions
- Procedures
- Linkages
- Applications
- Compare & contrast
- Describe what they understand
- Describe difficulty experienced
- Summarize
- Explain
Instruction

- Instruction check
- Pre test demonstrating pre-planning
- Your own understanding of instruction
- Unit test reflects other high stakes tests
2nd Essential - Note taking
Researchers - #1 Memory Aid - Writing it Down

- Complete homework assignment
- Prepare for unit test
- Prepare for high-stakes tests
When you multiply exponentials with the same base, you add the exponents.

Ex: \(3^2 \cdot 3^5 = 3^7\)

Ex: \(5^2 \cdot 5^8 = 5^{10}\)

Ex: \(7 \cdot 7^4 = 7^5\)

Ex: \(2^3 \cdot 5^2 \cdot 2^4 \cdot 5^6 = 2^7 \cdot 5^8\)
Title

Date

Objective

Vocabulary & Notation

Pattern Development

Rule

Examples

Variation

Exponentials

To simplify exponentials being multiplied with the same base.

Exponent - tells you how many times to use the base as a factor.

\[ 2^3 \] - Exponent

\[ \text{Base} \]

\[ 2^3, \text{ read } 2 \text{ to the } 3^{rd} \text{ power or } 2 \text{ cubed.} \]

By definition, \[ 2^3 = 2 \cdot 2 \cdot 2 = 8 \]

\[ \text{Ex } 3^4 = 3 \cdot 3 \cdot 3 \cdot 3 = 81 \]

How could we simplify \[ 2^3 \cdot 2^4 \] in exponential form?

\[ 2^3 \cdot 2^4 = (2 \cdot 2 \cdot 2) \cdot (2 \cdot 2 \cdot 2 \cdot 2) = 2^7 \]

How many times \( 2 \) being used as a factor?

\[ \text{Ex } 3^2 \times 3^5 = (3 \cdot 3) \times (3 \cdot 3 \cdot 3 \cdot 3 \cdot 3) = 3^7 \]

By def

= 3^7
\[ \frac{5^2 \cdot 5^8}{(5.5) \cdot (5.5 \cdot 5.5 \cdot 5.5)} = 5^6 \]

Is there a pattern?

**Rule 1.** When you multiply exponentials with the same base, you add the exponents.

\[ \text{Ex} \quad 3^4 \cdot 3^5 = 3^{4+5} = 3^9 \]

\[ \text{Ex} \quad x^4 \cdot x^2 = x^{4+2} = x^6 \]

**Generalizing:** \[ A^x \cdot A^y = A^{x+y} \]

\[ \text{Ex} \quad 7 \cdot 7^4 = ? \]

\[ = 7^5 \]

* If a number does not have an exponent, it is understood to be 1; \[ 7 = 7^1 \]
Use simple straightforward examples to clarify initial teaching!

Increase difficulty later.
Note check

- Student notes reflect instruction
- Contain title, date, objective, definitions, how to say it, pattern development, linkage, rules and exercises with developed rules
- White space
- Star * System
- Explanations ~ Cautions
3rd Essential - Homework
Homework

- Homework should reflect what you say you value.
  - Vocabulary & Notation
  - Conceptual Understanding & Linkage
  - Basic Facts & Procedures
Make sure students understand the concept or skill before sending home to practice.
Practice

- Guided
- Group
- Independent
Page 270, 1–32 odd
Homework-Studying

- Reading
- Thinking
- Reflecting
- Organizing
- Writing

- Analyzing
- Visualizing
- Reviewing
- Remembering
- Recalling
Read Sec. 9.4 - Expressions involving logarithms

Define logarithm

Write a procedure for converting logarithms to exponentials

Explain why when multiplying log with the same base, you add the logs

\[ \log (AB) = \log A + \log B \]

Page 270 1, 3, 6, 7, 9, 12, 13, 14, 21, 23, 31
Homework

Read Sec 9.4 - Adding Fractions
Define Fraction
Draw a model for adding fractions
Write a procedure for adding fractions
Explain the link between adding fractions and decimals

Page 270 1, 3, 6, 7, 9, 12, 13, 14, 21, 23, 31
Homework Assignment Sheet demonstrates thoughtful preparation
Homework check

- A quick look at the homework assignments suggest the care teachers take to reinforce the daily instruction to help students prepare for unit, semester and other high stakes tests.

- Star * System
4th Essential – Test Preparation
4th Essential- Test Preparation

Test what you say you value:

Instruction – Assessment – Balance

Questions reflecting other high-stakes tests

Cumulative questions

Practice tests - Parallel construction

Setting a date
Testing drives instruction
• Test Design
  – Design tests that encourage study.
  – Test what you say you value
Test Preparation

• Do you know what you are going to test your students on BEFORE you begin to teach a unit?

• Use the * System on notes, homework, and practice tests to prepare for test
Practice Tests

- Parallel constructed; especially for students who have not experienced success in math.
Monitor student learning
Memory Aids

Help your students remember
5th Essential - Tests

Form A ~ Form B
Test Check

- Balanced assessment
- Cover the assigned curriculum/benchmarks
- Questions reflect other high stakes tests
- Grades are fair
- Grades are portable
- Parallel constructed
Tests

- Are test results a reflection of instruction?
Organizing Student Learning

Making the connection -
Instruction to
Note taking to
Homework to
Test preparation to
Tests
Organizing Student Learning

Helps students focus and study more effectively and efficiently resulting in increased student achievement
This organization strategy leads to

- Transparency
- Credibility
- Trust
“5 + 1” Summary

Student-teacher relationships

~parent communication~

1) Understanding instruction
2) Notes that reflect & reinforce instruction
3) Homework that supports and reflects instruction
4) Test preparation
5) Parallel constructed tests
What are you willing to do?
Next steps

What are you willing to do to increase student achievement?

- Explicitly go over expectations with staff in August; “5+1”
- Parental communication
- Observe instruction in September/October with emphasis on “5+1” and understanding
- Collect grade distributions for 1st unit test
- Conduct pre- and post- observation conferences within a week and provide meaningful suggestions, recommendations, or directions that improve instruction
- Continue observations, conferences & monitor grade distributions
Next steps

- What are you willing to do to increase student achievement?
  - Create pre tests that reflect unit and other high stakes tests
  - Parental communication
  - Introduce new concepts and skills using concept development or linkage
  - Be more prescriptive & directive with notes that reflect instruction
  - Create homework assignments that encourage study
  - Use star * system in notes, homework & practice tests
  - Create parallel constructed tests
Recommended Next Steps