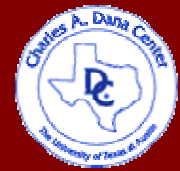


Supporting and Strengthening your High School Mathematics Program

Charles A. Dana Center

TASSP, June 11, 2003



The Instructional Program

Written



Tested



Taught



The Instructional Program in Texas pre-2002

TEKS
(written curriculum)



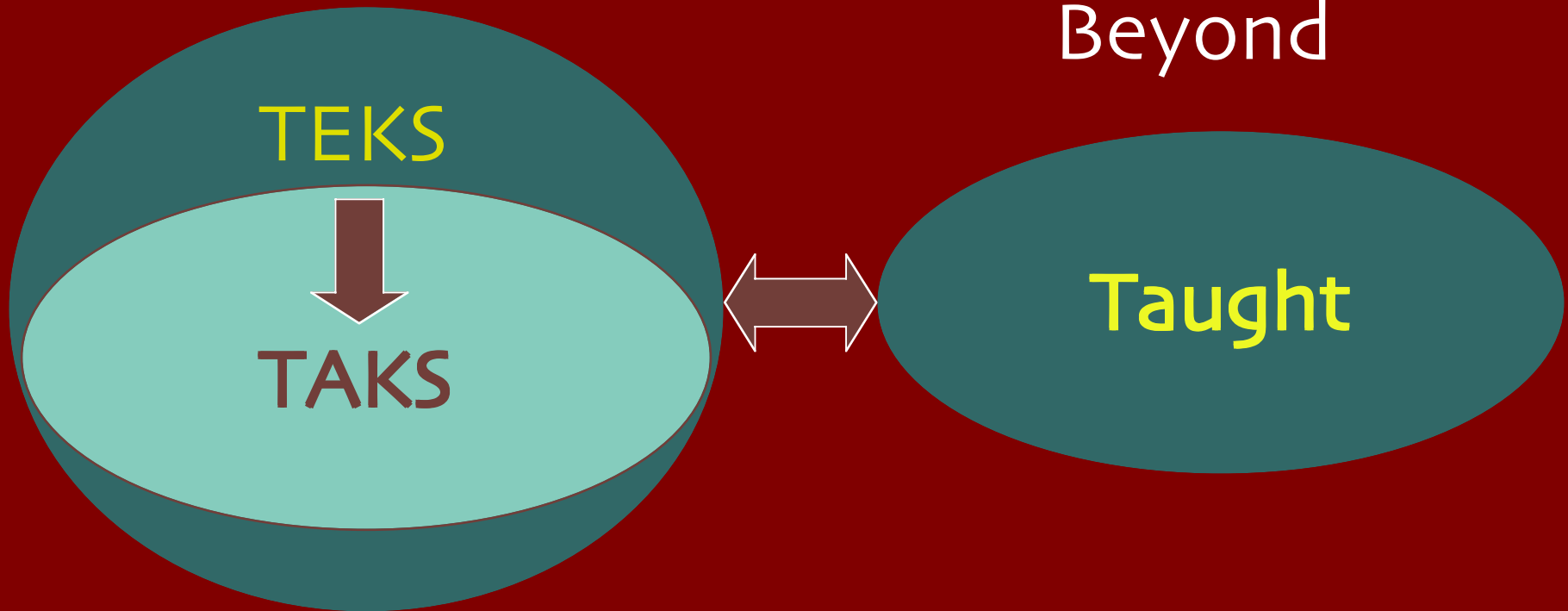
TAAS
(state-wide testing)



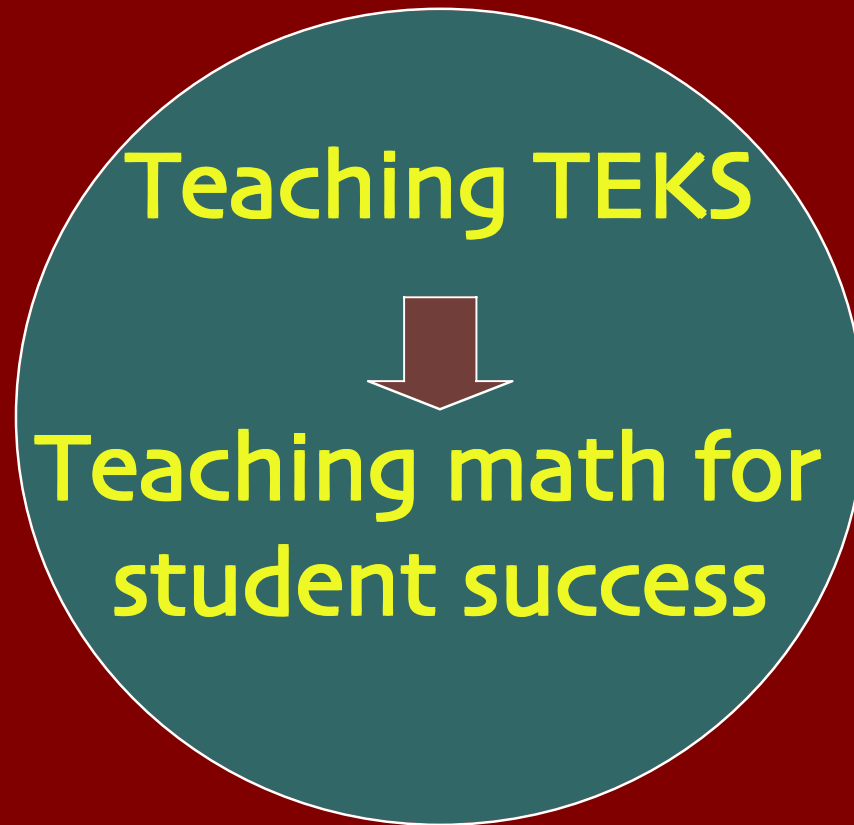
Taught



The Instructional Program in Texas 2002-2003 & Beyond

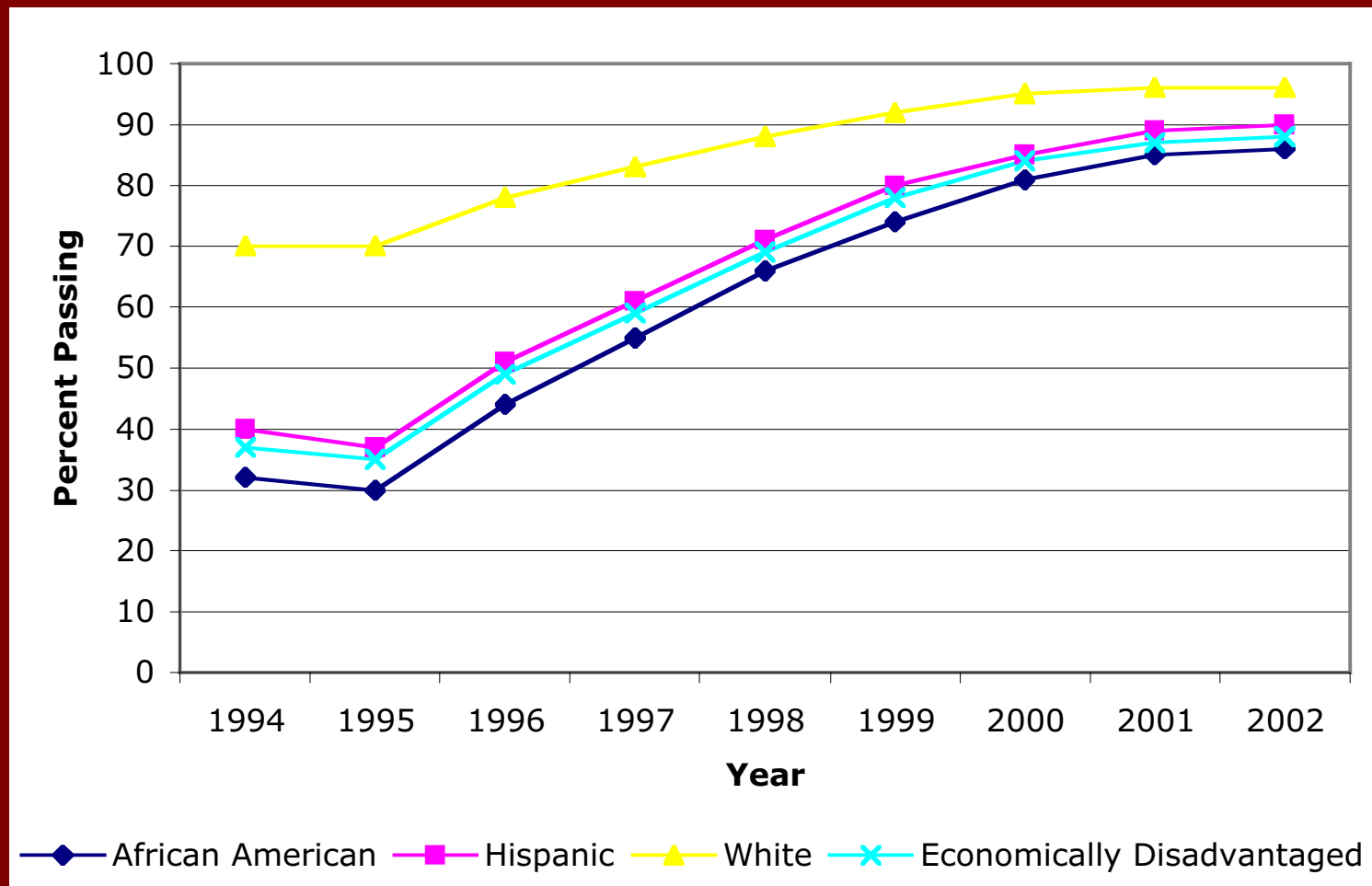


Goal: Student Learning/ Student Achievement



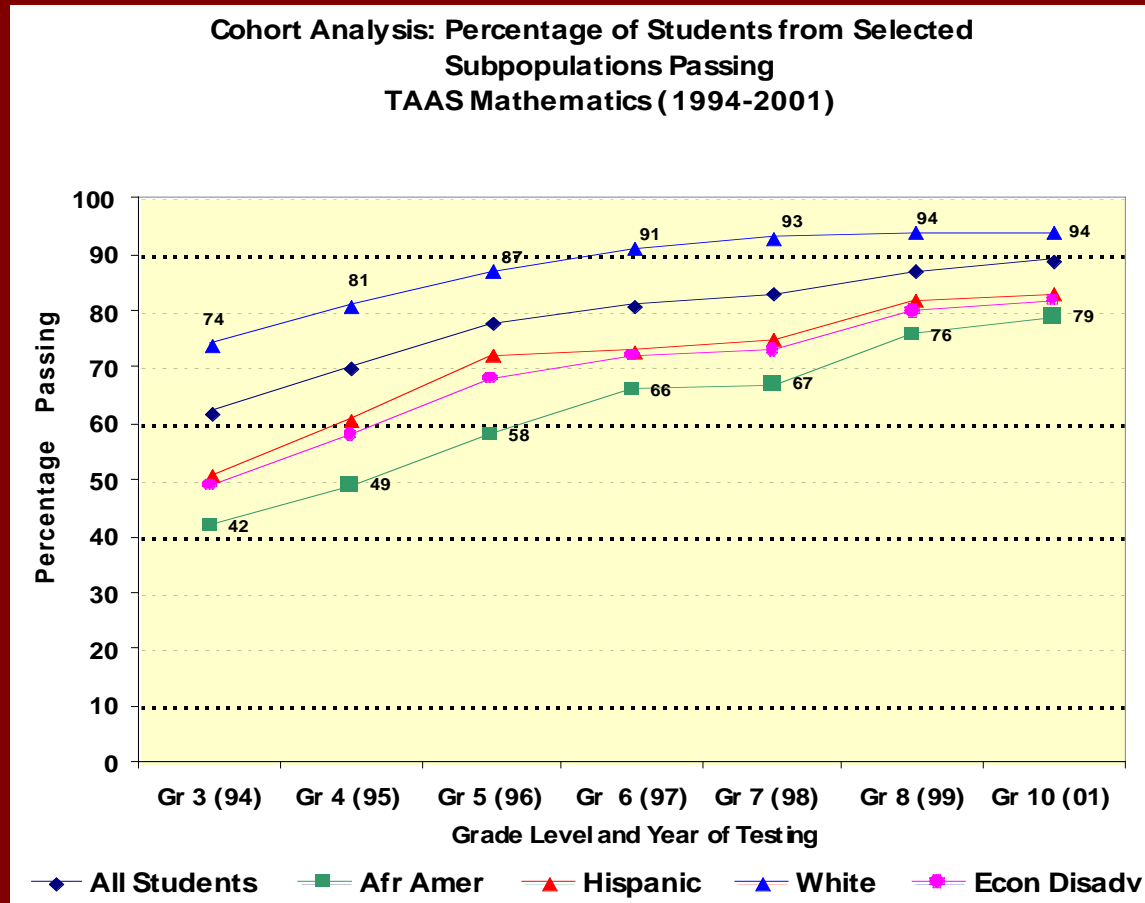
It's not about TAKS, it's about TEKS!

Statewide Passing Rates on Grade 8 Mathematics TAAS for Selected Subpopulations: 1994-2002



Source: Texas Education Agency, www.tea.state.tx.us

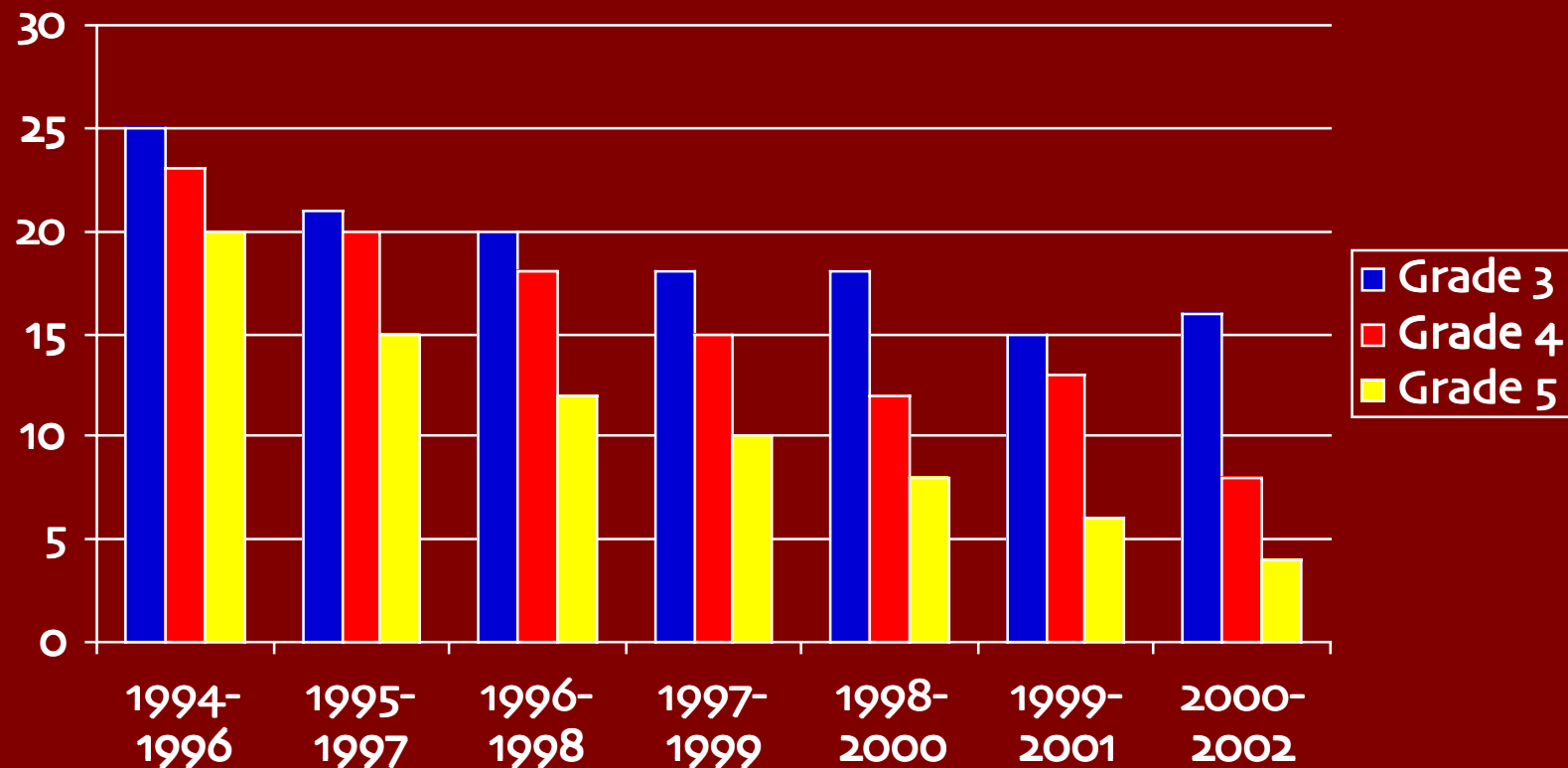
Cohort Analysis: Percentage of Students from Selected Subpopulations Passing TAAS Mathematics 1994-2001



Source: Texas Education Agency, www.tea.state.tx.us

Texas State TAAS Mathematics Results

Performance gaps between economically disadvantaged and non-economically disadvantaged students in terms of percentages of students passing TAAS.



Grade 4 NAEP Results

State rank using average scale score

Year	State	All Students	African American	Hispanic	White
1992	TX	18	9	12	12
	CA	33	36	39	34
	Number	36	36	42	42
1996	TX	6	1	6	1
	CA	41	36	39	40
	Number	44	37	44	44
2000	TX	5	1	1	1
	CA	38	30	35	31
	Number	40	30	38	40

Source: National Center for Education Statistics

1999 Third International Mathematics and Science Study: Grade 8

Average Mathematics Score	Students Scoring in the Top 10% Internationally	Students Scoring in the Top 25% Internationally
Michigan 517	10%	33%
Texas 516	13%	37%
Indiana 515	9%	30%
Oregon 514	10%	32%
Massachusetts 513	10%	31%
Connecticut 512	11%	31%
Illinois 509	10%	29%
Pennsylvania 507	9%	28%
United States 502	9%	28%
South Carolina 502	10%	30%
North Carolina 495	7%	25%
Idaho 495	5%	24%
Maryland 495	8%	27%
Missouri 490	4%	20%

Strengthening instructional programs and ensuring student success: An emphasis on using evidence-based research

To set the stage for looking at
research:

- **Make decisions about what is
valued; set expectations
- **Ask the right questions
- **Evaluate the research

Who sets expectations and determines what is valued?

National

No Child Left Behind

State

Texas Accountability System

District

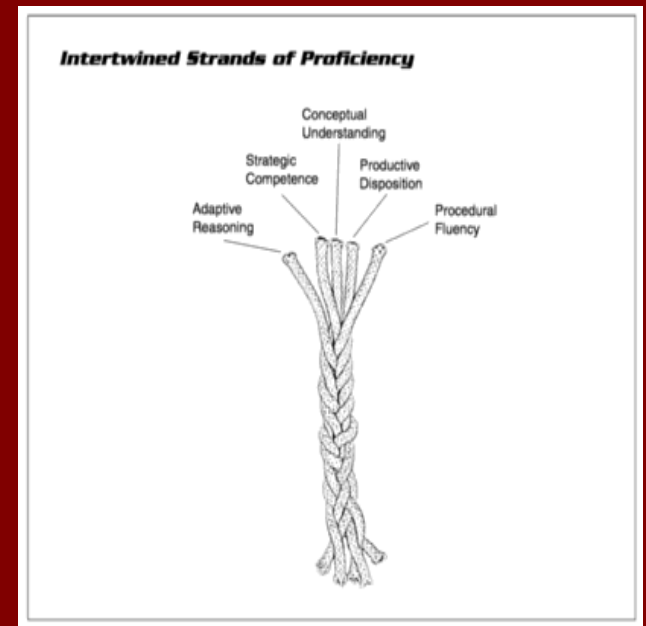
District Goals

Plus, it's the right thing to do for students.

What does it mean to learn mathematics successfully?

Mathematical proficiency: interwoven strands developed together; emphasizing no strand over the others

- **Understanding** (conceptual understanding)
- **Computing** (procedural fluency)
- **Applying** (strategic competence)
- **Reasoning** (adaptive reasoning)
- **Engaging** (productive disposition)



- *Adding It Up*, NRC, 2001

What does research suggest K-8?

- Opportunity to learn is considered the single most important predictor of student success
- Students learn best when presented with academically challenging work focused on sense-making, problem solving, and skill building
- Teacher beliefs about what students need to (and can) learn influence their instructional decisions
- The same teaching and learning principles apply to all students, including those with special needs

What does research suggest 9-12?

- Set clear goals and establish high expectations; create a sense of urgency
- Use data to guide instruction
- Focus on instruction and individual learning
- Support teachers and enhance collaboration
- Foster an environment of respect and affection for students
- Develop an effective professional development program
- Provide adequate resources, including graphing calculators

-Opening Doors: Promising Lessons from Five Texas High Schools, Charles A. Dana Center, 2001

-Teacher professional development and student learning of Algebra: Evidence from Texas. Holcomb, 2002

-Improving Algebra I End-of-Course Exam Scores: Evidence from the Field, Charles A. Dana Center, 2000

FINDINGS: Seven district factors essential to improvement

- courage to acknowledge poor performance and the will to seek solutions.
- systemwide approach to improving instruction.
- vision that focused on student learning and guided instructional improvement.
- new approaches to professional development.
- redefined leadership role.
- sustained reform over the long haul.

—Togneri, W. & Anderson, S. (2003) *Beyond Islands of Excellence*

FINDINGS: The role of the principal

- Provide instructional leadership
- Use data to guide decision-making and foster the use of data among their staff
- Observe classroom instruction and provide teachers with non-evaluative feedback
- Create structures and time for teacher collaboration
- Partner with cadres of teacher leaders to strengthen instructional supports
- Transmit and operationalize the district vision into the school
- Refocus professional development to meet district principles

- —Togneri, W. & Anderson, S. (2003) Beyond Islands of Excellence

How do we use research and evidence to improve student performance?

Data

Expectations

Professional Development

Collaboration

Support

Leadership

To help close the gap...



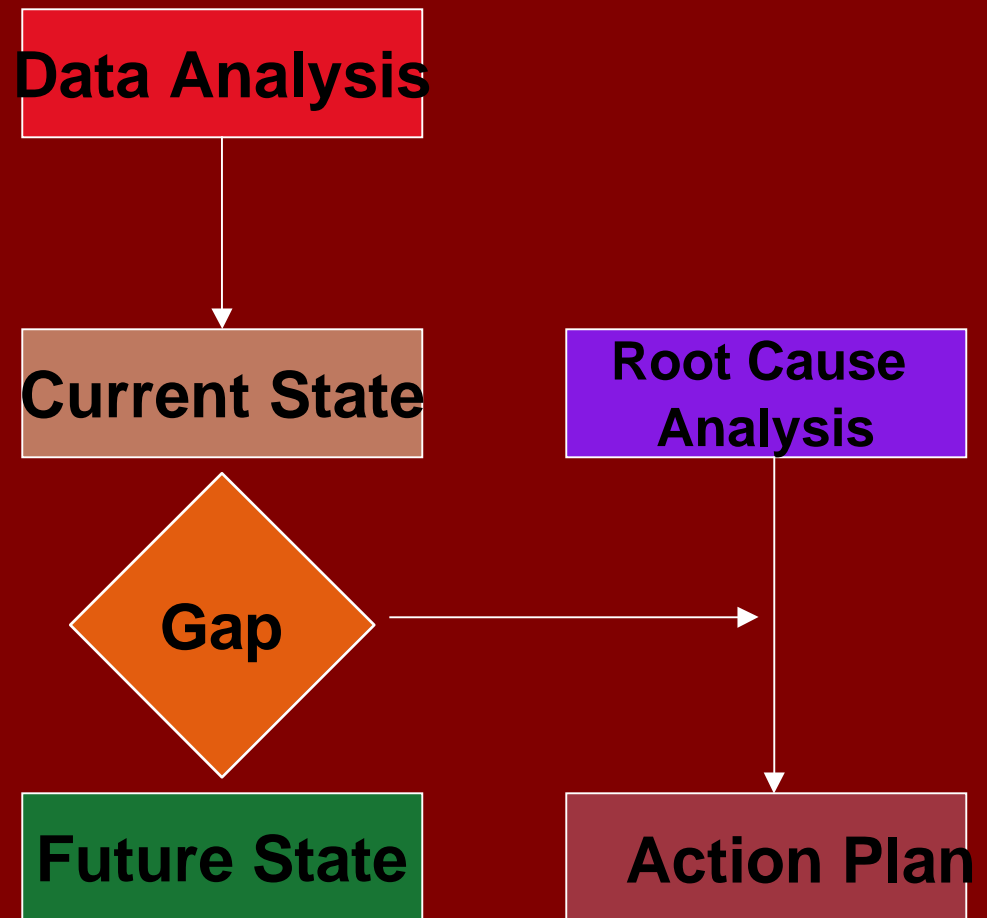
Current State



Future State

Dana Center Methodology - Phase I

1. Analysis of an Identified Problem
2. Goals and Expectations
3. Action Plan



What Have We Learned?

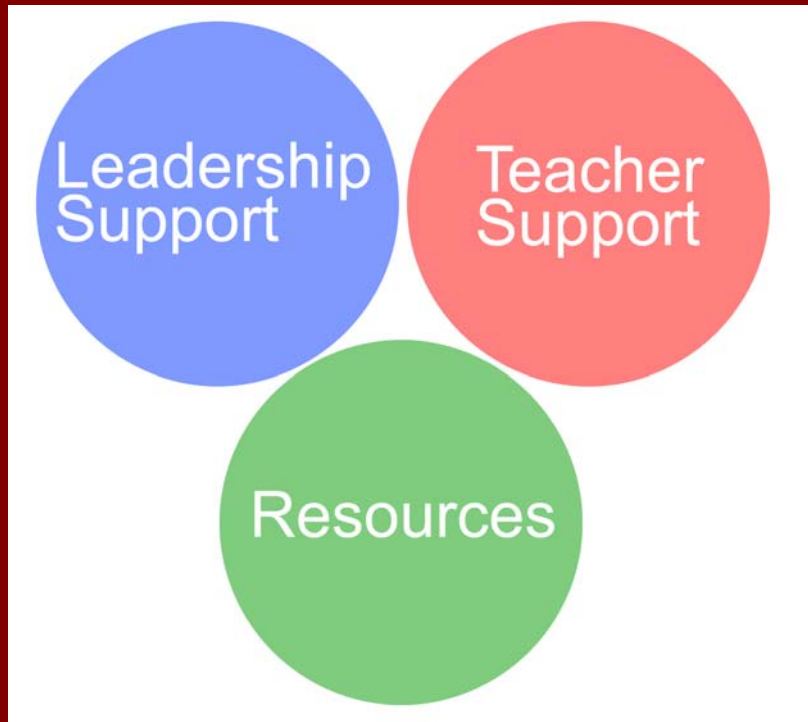
Research

- Need to...
 - Set Measurable, High Expectations
 - Need to Use Comprehensive Data
 - Need to Align Curriculum, Teaching and Assessment

Evidence

- Importance of...
 - Leadership Capacity
 - External Catalyst
 - Integrating *Leadership Development* and *Teacher Professional Development*

Phase II



Current State

Technical Assistance

Toolsets



Future State

Dana Center Methodology - Phase II

- Phase I generates an action plan
- Phase II provides support to successfully implement plan
 - using a professional teaching model
 - including focused leadership strategies
 - which are grounded in research

- Leadership Team Support
 - Tailored Technical Assistance
 - Leadership Development
 - Effective use of Available Resources
 - Follow-up Support
- Teacher Support
 - Tailored Technical Assistance
 - Professional Development
 - Effective use of Curriculum Resources
 - Follow-up Support

What resources are there to help support teachers for high school mathematics?

Resources and Tools
Assessments
Professional Development

The Instructional Program

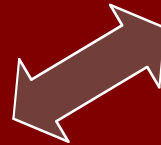
Written



Tested



Taught



Mathematics TEKS Toolkit

www.mathtekstoolkit.org

Mathematics TEKS Toolkit

Center for Educator Development for Mathematics



TEA | CAMT | TASM | TCTM

Information Especially for...

Search

 **Catalog** About Us Other TEKS Toolkits Dana Center Websites Site Map Text Version

What's New

[CAMT 2002 Program Online](#)

To order Mathematics Products and Publications, [download order form](#) or visit the Products and Publications section of the Dana Center website.

[TAKS Information Booklets](#) (new from the TEA site)

For a complete list of What's New archives, [click here](#).

Resources for implementing the mathematics Texas Essential Knowledge and Skills (TEKS) and for improving mathematics programs in Texas



Texas Essential Knowledge and Skills (TEKS)

Overview and History, Structure of the TEKS, and TEKS in English or Spanish

Supporting the TEKS and TAKS

Clarifying Activities, Clarifying Lessons, Assessment Connections K-8, TAKS Objectives, TEKS/TAAS/TAKS Comparison Charts, TEKS/TAKS Vertical Alignment Charts, and Algebra I Assessments

Instruction and Assessment

Resources for Teaching and Assessing as well as State, National, and International Assessment Information and Data

Professional Development

Professional Development Strategies and Opportunities, including TEXTEAMS, TEKS for Leaders, and Conferences

Resources

Classroom Tools and Technology, Dana Center Products and Services, Research, Articles, Conference and Meeting Presentations, and Professional Organizations and Agencies

Program Development: Quality Mathematics for All

Creating a Successful Mathematics Program and Mathematics for All

TEKS Supporting TEKS and TAKS Instruction and Assessment Professional Development Resources Program Development

About Us Other TEKS Toolkits Dana Center Websites Site Map Home

Resources for Mathematics TEKS Support available through the Dana Center

Math TEKS booklets (print, web)

TEKS Trails (Algebra, Geometry, 3-5, 6-8)

K-12 TEKS → success for all in AP Calculus (chart and pd)

Foundations for Functions (for vertical teams)

Charts, posters (print) & other resources

Assessments

Online student/teacher resources (Agile Mind, Think5)

The Instructional Program

Written

Taught

Tested



The Assessment Principle

Assessment should

- support the learning of important mathematics
- furnish useful information to both teachers and students
- be a valuable tool for making instructional decisions
- be a routine part of the ongoing classroom activity rather than an interruption

Principles and Standards for School Mathematics, NCTM, 2000, p. 22

Where and when to assess ...

Assessment Tools	Timing
Diagnostic assessments, state or district	Beginning of school year
Benchmark assessments, campus or district	According to campus/district schedule
(TAKS) Texas Assessment of Academic Skills	End of school year, dates set by state

Where and when to assess ...

Assessment Tools	Timing
Diagnostic assessments, state or district	Beginning of school year
Performance assessments	Ongoing; teachers continually monitor student progress
Benchmark assessments, campus or district	According to campus/district schedule
(TAKS) Texas Assessment of Academic Skills	End of school year, dates set by state

Performance assessments tools and TEXTEAMS practice-based professional development

Algebra I Assessments (print, CD, web)

Geometry Assessments (print, CD, web)

Algebra II Assessments (coming summer 2003)

Middle School Proportionality Assessments
(coming summer 2003)

Mathematics Standards in the Classroom,
Grades 3-5 and 6-8 (print, CD, web)

Ongoing performance assessments: asking the right questions

What would a teacher ask ...

To start with?

To probe further?

For what would a teacher listen?

For what would a teacher look?

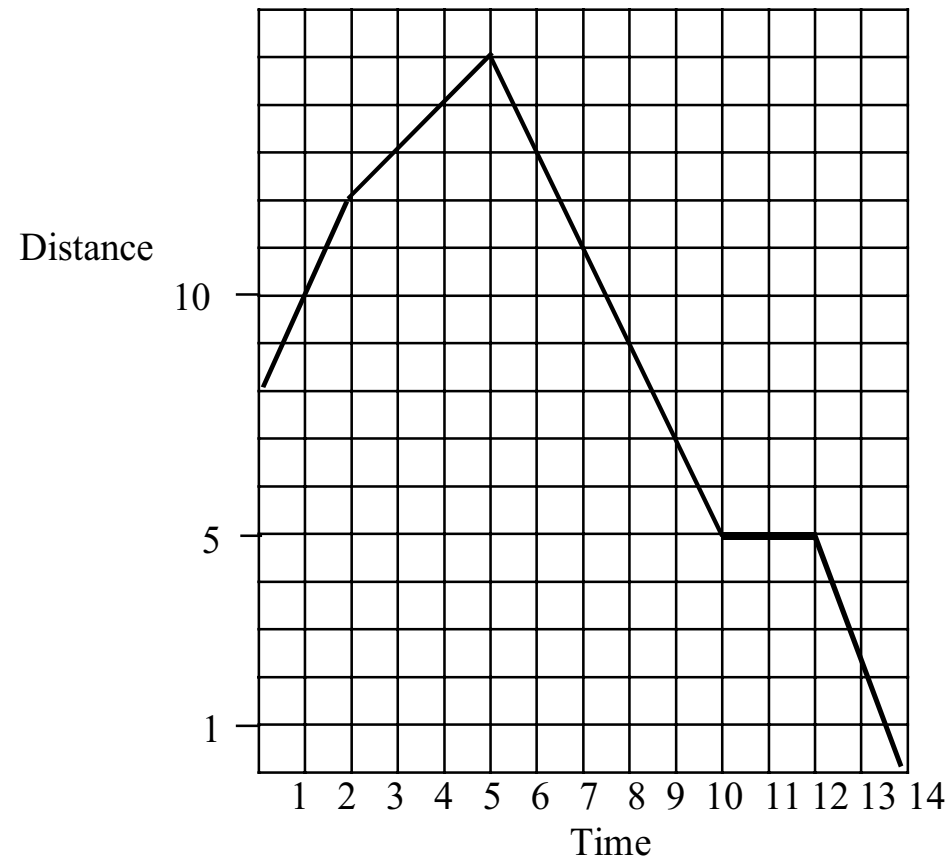
Critical elements for instruction:

Understanding the TEKS, knowing the mathematics content, and communicating with students.

Algebra I Assessment, sample

Distance and Time

The graph below represents distance as a function of time.



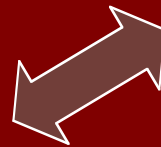
Create a situation this graph might represent. Choose appropriate units for time and distance. Describe your situation in detail.

The Instructional Program

Written

Taught

Tested



TEXTEAMS Mathematics Institutes

Statewide K-12 professional development
with an emphasis on ...

- Improving mathematical content knowledge of teachers
- In-depth attention to the TEKS
- Connections to classrooms and instructional practice
- 3,600 leaders; 130,000 teachers; 37 math and science institutes

Developed by the Dana Center;
funded by TEA.

Mathematics TEXTEAMS Institutes Middle School

Rethinking Middle School Mathematics series:

- Proportionality Across the TEKS
- Algebraic Reasoning Across the TEKS
- Numerical Reasoning Across the TEKS
- Geometry Across the TEKS
- Statistical Reasoning Across the TEKS (6-12)
- Problem-solving

Practice-based Professional Development:

- Middle School Proportionality Assessments
(fall 2003)

Mathematics TEXTEAMS Institutes High School

- Algebra I: 2000 and Beyond
- Geometry: Supporting TEKS and TAKS
- Algebra II
- Precalculus
- Rethinking Secondary Mathematics series:
 - Algebraic and Geometric Modeling
 - In-depth Secondary Mathematics
 - Statistics Across the TEKS

Practice-based Professional Development:

Algebra I Assessments

Geometry Assessments

Algebra II Assessments (fall 2003)

Professional Development for Leaders

TEKS for Leaders

- **Choosing a TEKS Focus: Standards and Assessment
- **Data Analysis: Using Data to Ask Good Questions
- **Middle School Mathematics for Leaders: What You Need to Know About Algebra and Algebra Readiness
- **Algebra for Leaders
- **Meaningful Learning: An Instructional Model
- **A Study of the TEKS: Developing an Understanding for Teaching

The challenge: What can we do now?

- Data
Expectations
Professional Development
Collaboration
Support
Leadership

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Presentation available under Resources:
www.mathtekstoolkit.org

Reference List

- Charles A. Dana Center. (2000). *Improving Algebra I End-of-Course Exam scores: Evidence from the field*. Austin, TX: Author.
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