

Science Update

Toyota Leadership Academy
Texas Regional Collaboratives
July 10, 2003



The Rainbow Giver
Native American Art

Presented by:
Chris Castillo-Comer
Director of Science



National Science Foundation

Presidential Awards for Excellence in Mathematics and Science Teaching

Ahead of the **CURVE**



NATIONAL AWARDEES '02

Naveen Cunha

5/6th Gr Science Teacher
Oakwood Inter.Sch.
College Station ISD,
College Station, Texas

Bradley John Neu

7th/8th/9th Bio. Teacher
All Saints School
Lubbock, Texas

**Texas Presidential Awardees
for Excellence in Excellence in Science Teaching
State Finalists '03**

Gail Granger Bromiley-McGee

DeBakey High School for Health Professions
3100 Shenandoah
Houston, TX 77021

Bruce Steven Hartman

Johnston Middle School
10410 Manhattan
Houston, TX 77096

Dolores Louie Garay

Redd School
4820 Strack Rd
Houston, TX 77069

To apply: www.nsf.gov/PA

Desired Alignment

Written
Science
Curriculum:
TEKS

Complete
Science
Curriculum
Taught



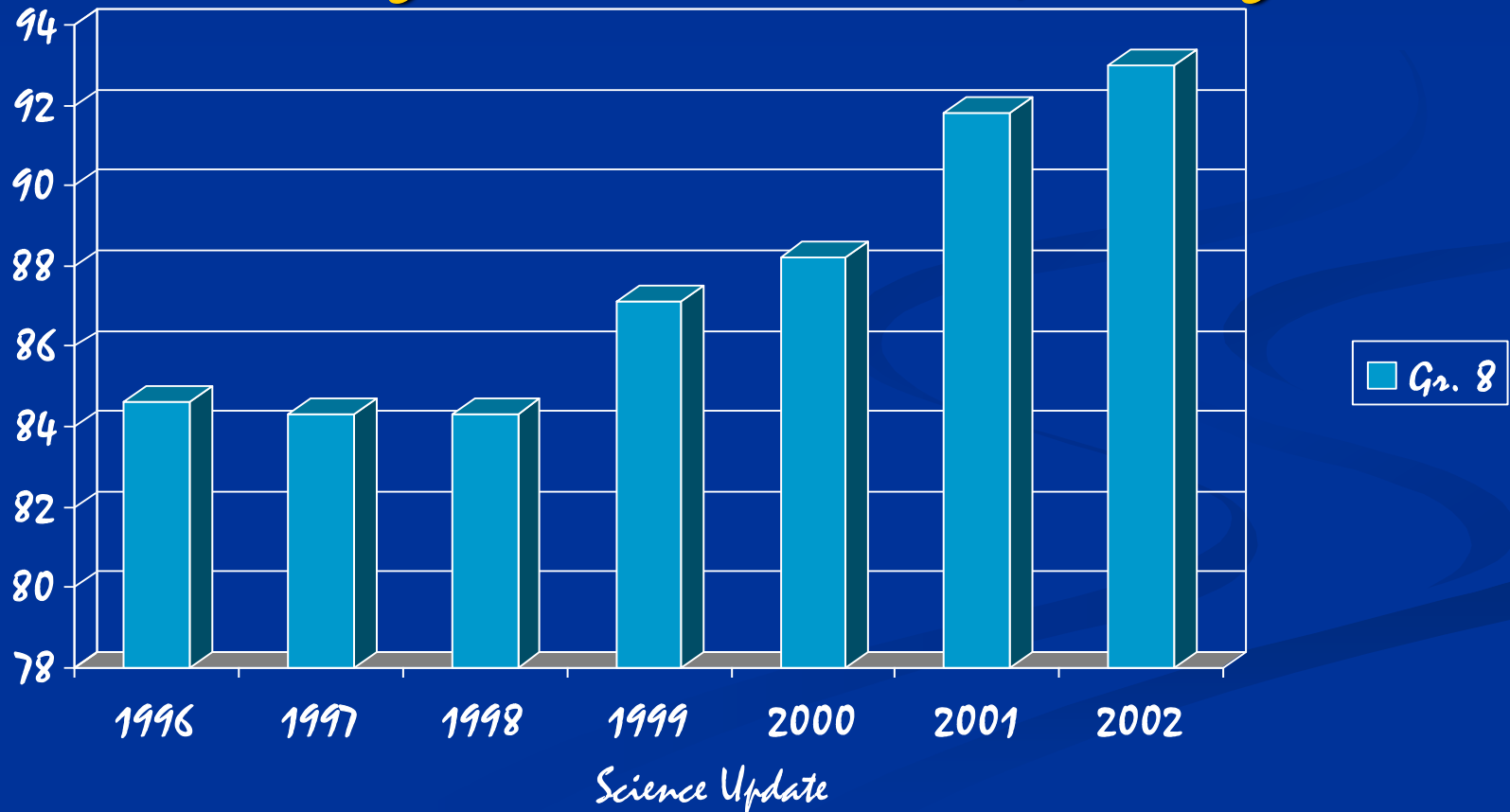
Assessed Science
Curriculum:
TAKS

Science Update

Science History: The Road to Academic Success



TAAS grade 8: Percent passing



Science Update

What's new
in science
education?



The Good News Is...

- **\$101 Million to states for the Math/Science Partnership Program**
 - Texas will receive \$8.47 Million to support developing Science and Math partnerships that will increase student and teacher performance in high needs schools.
- **Federal Intent:** To correct some of the problems districts are currently experiencing under the reauthorization of Title II; Part A funds, in the areas of science and math.



Legislative Update



National:

- **NCLB: Includes Science**

State:

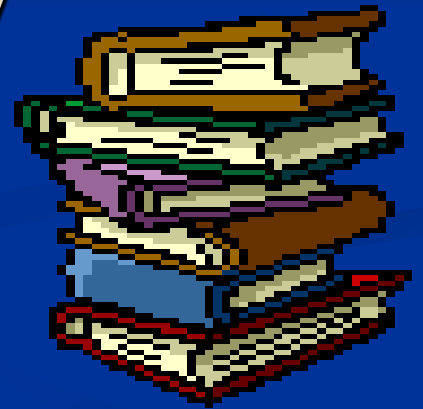
- **HB 411: Science Initiative**
- **8th grade Science Assessment**

**Legislative Briefing Book on TEA WEBSITE:
JULY 23**

www.capitol.state.tx.us

Textbook Adaptions

- Biology, AP and IB Biology not affected
 - June 21-26, 2003: State Review Panel
 - September 2003: SBOE Public Testimony
- PT I not affected.
- Most textbooks likely delayed
 - due to budget
- Cycle modification; proclamation schedule, grade level and subject areas



Texas Earth Science Task Force



Formed by SBOE to make recommendations on how to Improve Earth Science in the Texas Schools.

Some Options being considered:

- 8th Grade Earth Science
- Earth Science as one of three courses for RHSP
- Earth Science as 4th HS course for DAP



TAKS Science Results



1. How did we do?
2. How did we get those scores?
3. How can we improve?



The science education community must investigate these three questions...

How We Did Overall

Science TAKS	Met Standard	Commended
Elementary at Grade 5	74%	4%
Grade 10	69%	2%
Grade 11	67%	2%

Changes in Reporting TAKS Data

- **Demographic groups now being reported per NCLB**
 - **African-American**
 - **Hispanic**
 - **White**
 - **Economically Disadvantaged**
 - **Limited English Proficient (LEP)**
 - **Special Education**

Changes in Reporting TAKS Data

- **There are three categories for performance on TAKS: commended, met standard, and did not meet standard. Standards are being phased in over a 3 year period**
- **There is no TLI**
- **There is no objective mastery**

Summary Data By Objective Has Changed

Objective information is limited to total number of items tested, average number of items correct, and percentage of average items correct.

Summary Information By Objective Has Changed

$$\frac{\text{Average number of items correct}}{\text{Total number of items tested}} = \frac{\text{Percent of Average Items Correct}}{\text{Items Correct}}$$

Example from grade ten, Science objective 1

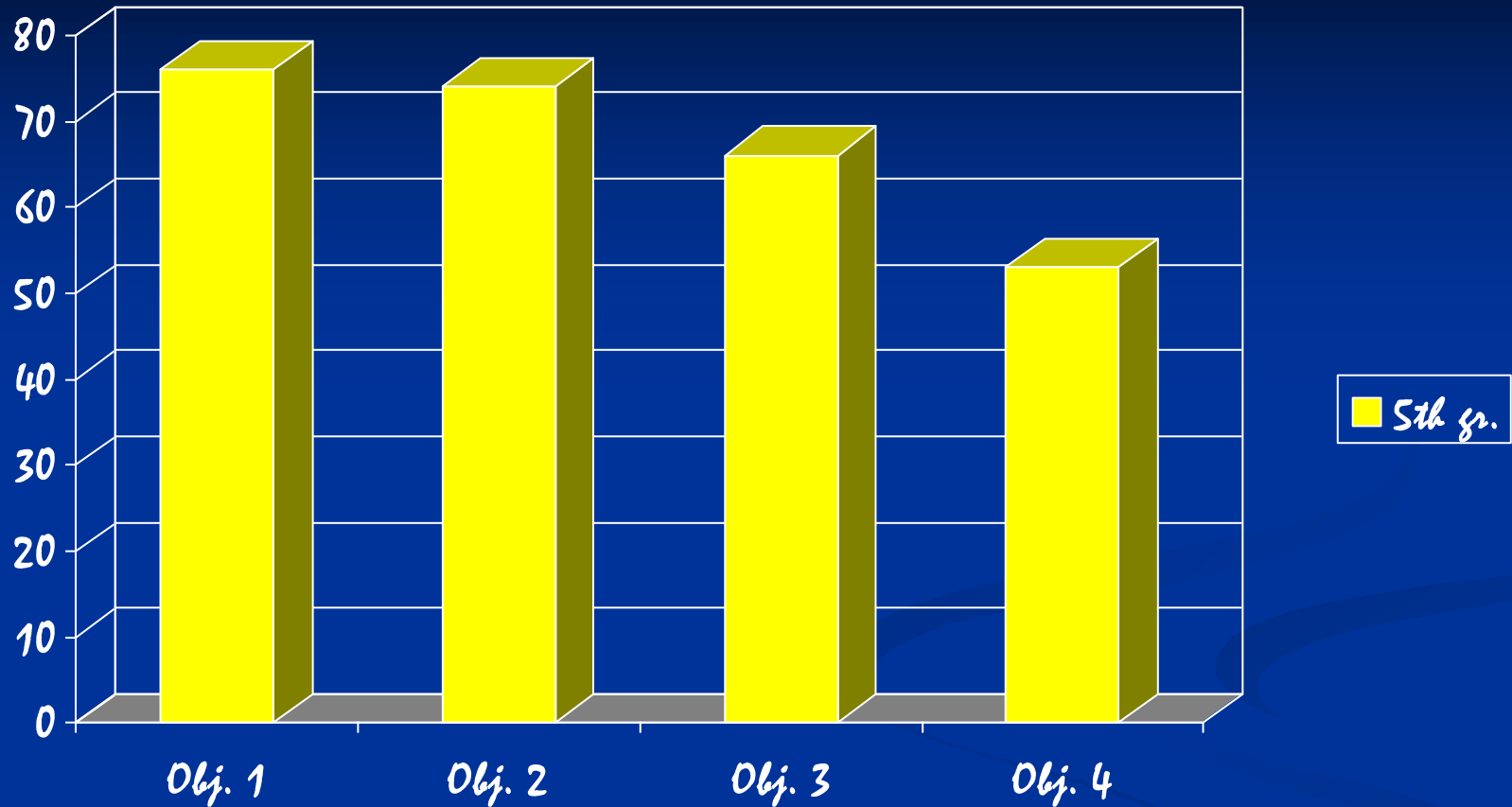
$$\frac{11.0 \text{ (average number of items correct)}}{17 \text{ (total number of items tested)}} = 65\% \text{ (percent of average items correct)}$$

ELEMENTARY SCIENCE

Average Items Correct By Objective

<i>Elementary Science Objectives</i>	<i>5TH</i>
1. Nature of Science <i>Number correct/ objective item number</i>	76% 9.9/13
2. Life Sciences <i>Number correct/ objective item number</i>	74% 6.7/9
3. Physical Sciences <i>Number correct/ objective item number</i>	66% 5.9/9
4. Earth Sciences <i>Number correct/ objective item number</i>	53% 4.8/9

Elementary Science: Percent of Average Items Correct



Objective 1: Nature of Science

76%

Objective 2: Life Sciences

74%

Objective 3: Physical Sciences

66%

Objective 4: Earth Sciences

53%

Commended
Performance:
4%

Fifth Grade:

For the first time this year, elementary students took a state Science test:

74% Met Standard

4% Commended Performance

Passed all tests: English 65%

Reading : 80% Passing

17% Commended Performance

Math: 86% passing

17% Commended Performance

***We far exceeded Science Field Test Projected Results for 5th Grade:
64% Met Standard***

Fifth Grade:

Spanish test takers:

75% passed Reading

66% passed Math

32% passed Science

Only 7,476 fifth-grade students statewide took one or more Spanish language TAKS exams.

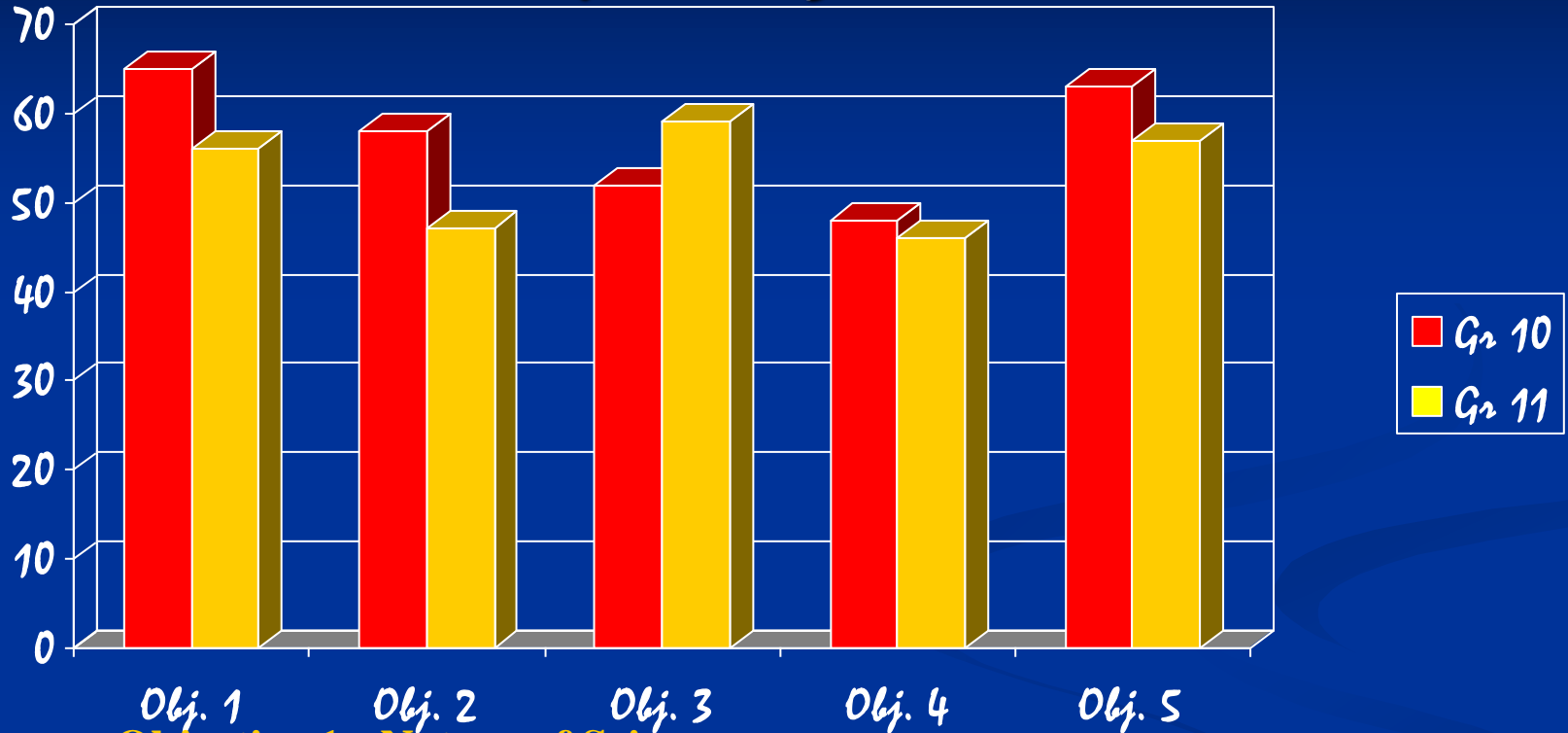
HIGH SCHOOL SCIENCE

Average Items Correct By Objective

<i>Science Objectives</i>	10th	11th
1. Nature of Science <i>Number correct/ objective item number</i>	65% 11.0/17	56% 9.5/17
2. Organization of Living Systems <i>Number correct/ objective item number</i>	58% 6.4/11	47% 3.7/8
3. Interdependence of Organisms & Environ. <i>Number correct/ objective item number</i>	52% 5.7/11	59% 4.7/8
4. Structures and Properties of Matter <i>Number correct/ objective item number</i>	48% 3.9/8	46% 5.1/11
5. Motion, Forces, and Energy <i>Number correct/ objective item number</i>	63% 5.0/8	57% 6.3/11

High School Science

Percent of Average Items Correct



Obj. 1: Nature of Science

Objective 2: Organization of Living Systems

Objective 3: Interdependence of Organisms and the Environment 59%

Objective 4: Structures and Properties of Matter

Objective 5: Motion, Forces, and Energy

Tenth Grade:

Science: First time testing Biology, Chemistry, and Physics Concepts

69% Met Standard

2% Commended Performance

Passed all tests: 52%, only 1% Commended Performance

ELA : 72% Passing

5% Commended Performance

Math: 71% Passing

7% Commended Performance

SS: 86% Passing

15% Commended Performance

***We exceeded Science Field Test Projected Results
for 10th Grade: 64% Met Standard***

Eleventh Grade:

Science: First time testing Biology, Chemistry, and Physics Concepts

67% Met Standard

2% Commended Performance

Passed all tests: 49%,
only 1% Commended Performance

ELA : 69% Passing

5% Commended Performance

Math: 68% Passing

6% Commended Performance

SS: 90% Passing

9% Commended Performance

Field Test Projected Results: 73% Met Standard

Science Update

A DIFFERENT VIEW:

Science Group Performance: Percent Met Standard

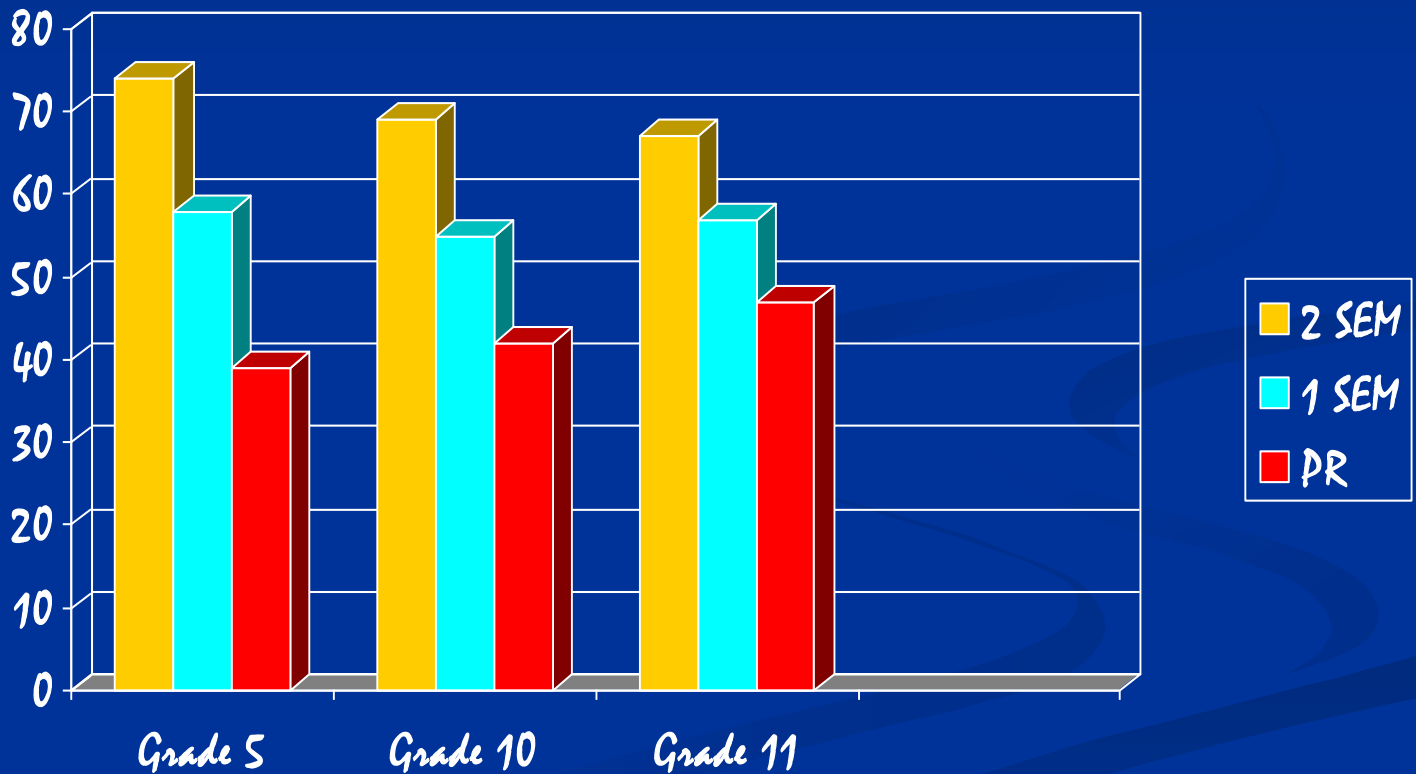
<i>Student Group</i>	<i>5th</i>	<i>10th</i>	<i>11th</i>
African American	59	52	52
Hispanic	65	55	56
White	87	83	77
Economically Disadvantaged	63	52	53
Limited English Proficient	41	27	29
Special Education	51	35	33

From the Phase-In Report

Science TAKS	Met Standard 2003	Would Have Met Standard 2004	Would Have Met Standard 2005
5th % of Students	74	58	39
% of items correct	60.0	67.5	75.0
# of items correct	24/40	27/40	30/40
10 th % of Students	69	55	42
% of items correct	49.1	56.4	63.6
# of items correct	27/55	31/55	35/55
11 th % of Students	67	57	47
% of items correct	43.6	49.1	54.5
# of items correct	24/55	27/55	30/55
schedule for Exit Level Phase in	(2004)	(2005)*	(2006)*

Science Assessment Results

Phase-In Standards-All Students



Science Update

Science Update



How Can We Improve?

Set High Expectations



Most secondary students plan to attend a four year college, more than parents and teachers think plan to attend...

- **71% of secondary students plan to attend a 4 year college.**
- **52% of parents think their child will attend a 4 year college.**
- **Secondary teachers think that 32% plan to attend a 4 year college.**

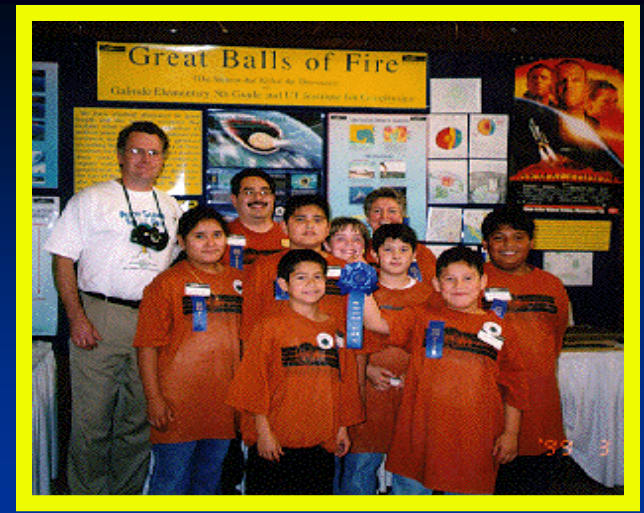
Metropolitan Life Survey of the American Teacher 2000

Policy Implications for Elementary Schools



- **Equipment and a budget for consumables for science needs to be planned and in place**
- **Professional development in areas of need is essential**
- **K-5 science content should be aligned**
- **Reviewing important data-Early Indicator Reports should be a part of school activities**
- **Interventions for struggling students are crucial**
- **Bilingual classrooms should have materials in Spanish such as the TEKS and Information booklets**

Policy Implications for Elementary Schools



■ Trend for Departmentalized Science:

Pros:

- Enthusiastic and Certified Science Teacher
- School Clearinghouse for Science issues: Budget, Equipment, Lab space, Materials

Cons:

- K-3rd grade departmentalization not research-based
- Once a week 20-40 min. science sessions will not be sufficient to teach all of the Science TEKS
- Collaboration with all Elementary Teachers is suggested

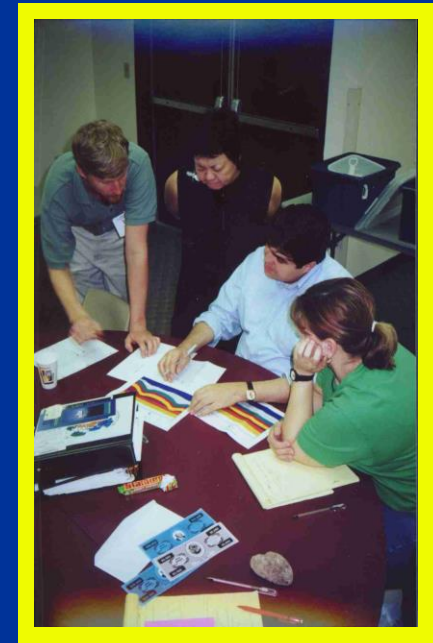
Policy Implications for Middle School



- **Align with Elementary and High School Curricula**
- **Keep Middle School science instruction strong**
- **Use assessments that can help to improve your program: Be wary of Test Prep Materials**
- **Stress the Earth Science concepts needed for Objective I in the high school assessments**
- **For students who will be on the Biology, Chemistry, Physics sequence in High School: strengthen the teaching of Physical Science**
- **IPC or Biology at grade 8 is not recommended: Serious gap before the 10th and Exit Level tests**

Policy Implications for High School

- Many high schools have implemented a
 - Policy for 3 years of science so that
 - students are enrolled in science during
 - the 11th grade
 - Policy that IPC cannot be taken by
 - Juniors or Seniors
- Conceptual science courses as well as Honors courses should be established to serve diverse learners especially in Chemistry and Physics.
- Safety in the Labs should be paramount...
 - Crowding of students in science is dangerous
 - Science professional development is crucial
 - Plan for more students taking more science: Struggling students may need 4 credits of science



Science Update

Science Resources
needed in
every school...



Available from TEA:

Science TEKS

<http://www.tea.state.tx.us/teks/index.html>



TAKS Information Booklets

<http://www.tea.state.tx.us/student.assessment/taks/booklets/index.html>

2003-2004 Testing Calendar

<http://www.tea.state.tx.us/student.assessment/admin/calendar/calnd03.html>

Released Tests and Interactive Online Tests (TAAS)

<http://www.tea.state.tx.us/student.assessment/resources/release/index.html>

- Science Study Guides
- Guidelines for Field Experiences
- Science and High School Counselors
- Science and Middle School Counselors
- Science and Elementary School Counselors
- Latest Science TAKS PowerPoint K-12 Data and Analysis
- Biology Textbook Adoption PowerPoint
- Science Safety PowerPoint

Science Study Guides



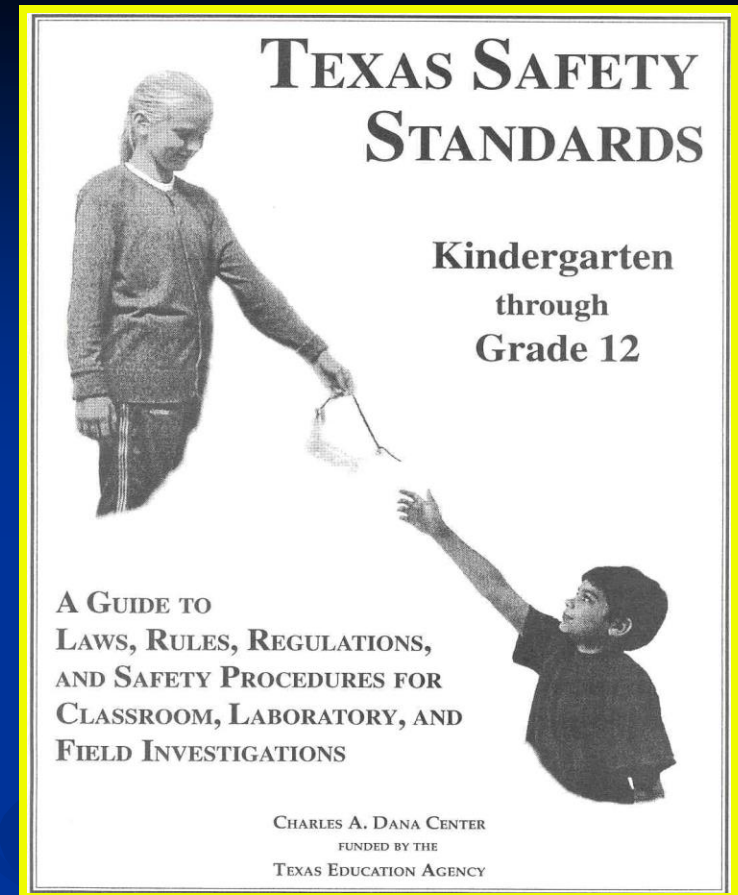
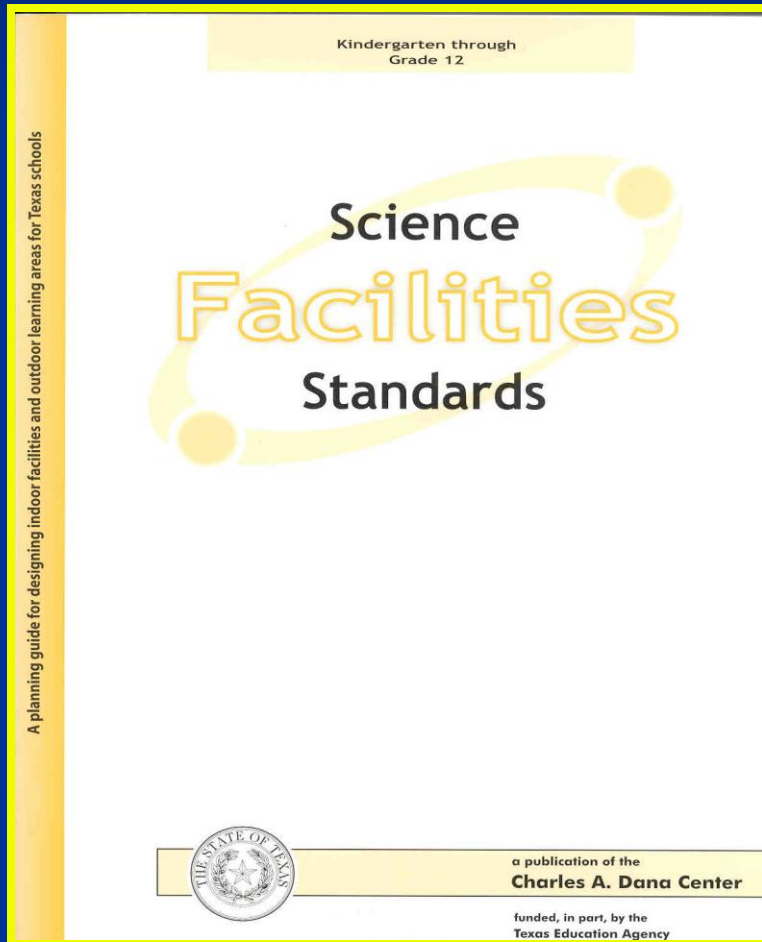
- By law, the Agency must provide materials to those students who do not pass the TAKS science test.
- The study guides for Science at grades 5 and 10 will be available to districts after the scores are sent in late spring 2003.
- The Science Study Guide is bound with Mathematics.
- Each district is responsible for making sure that students receive a study guide for the subject test they did not pass.
- Study Guides will also be online at the TEA website.
- TAAS exit level study guide will also be put on the web.

Science/ Student Assessment Listserve

- Searching for the latest information in Science and Student Assessment? Join the listserve!

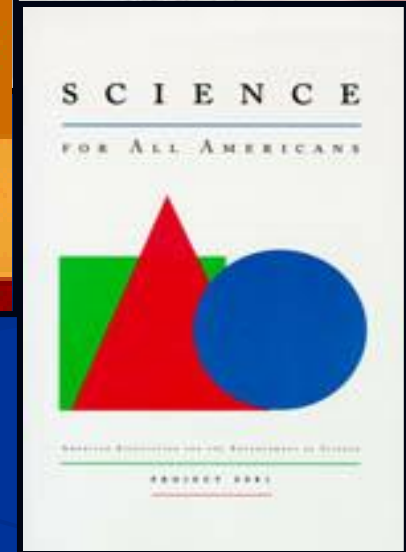
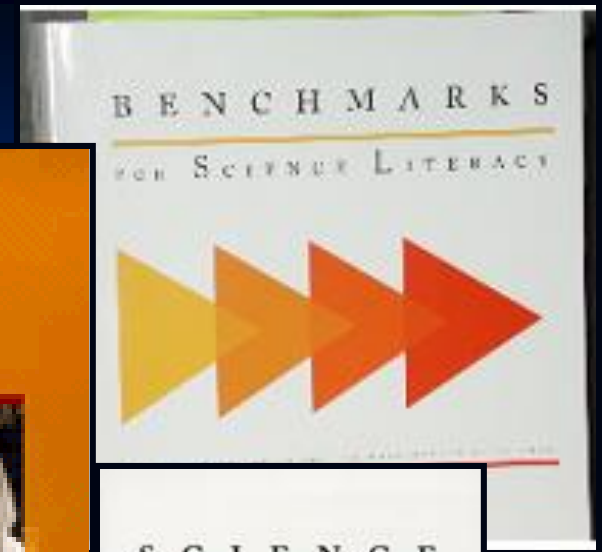
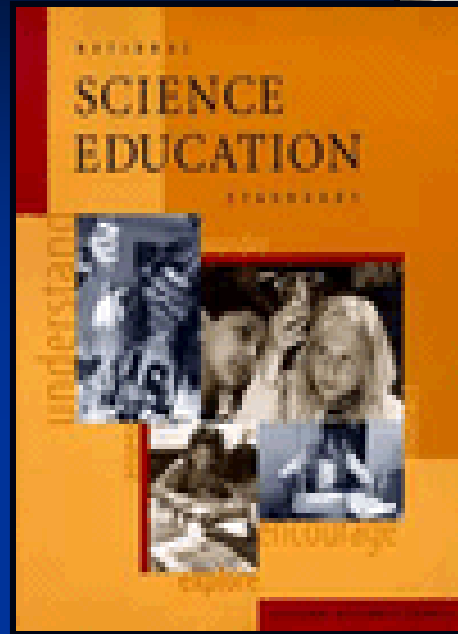
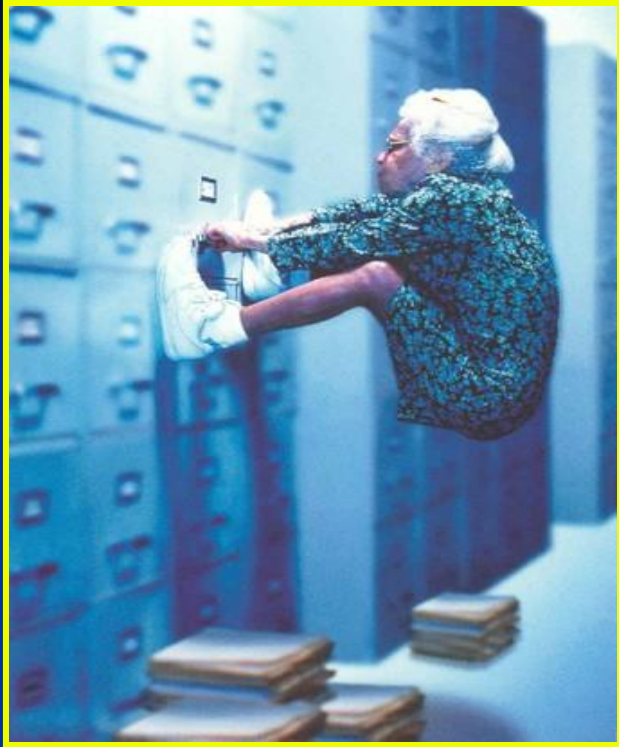
www.tea.state.tx.us/list/

Safety and Facility Resources:



Also available online:
www.tenet.edu/teks/science/safety

www.nsta.org



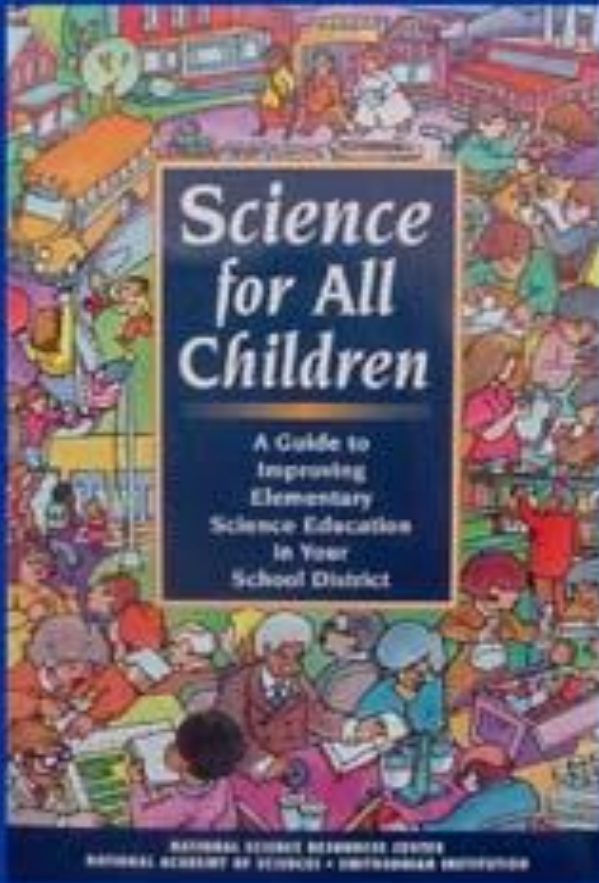
www.aaas.org

Library Resources:

These National Science Documents help to understand the content that is contained in the TEKS.

Science Update

Five Critical Elements for Reform



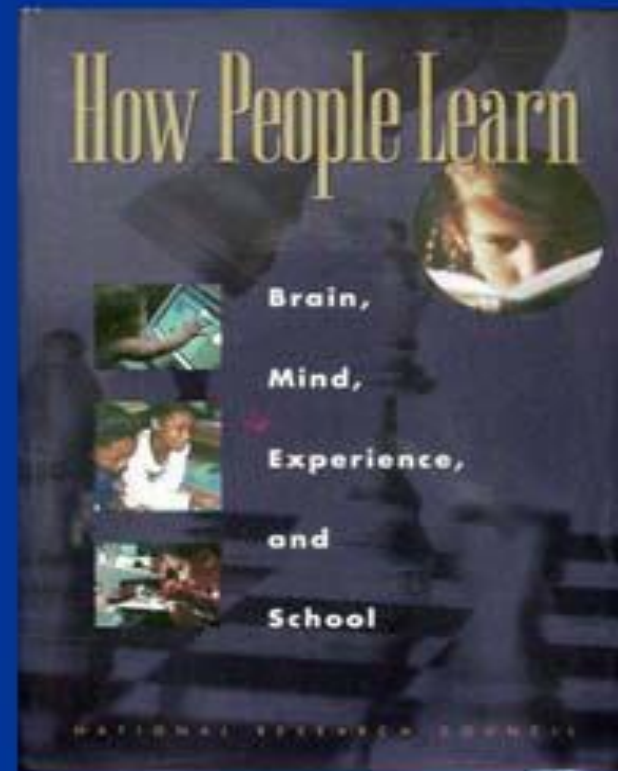
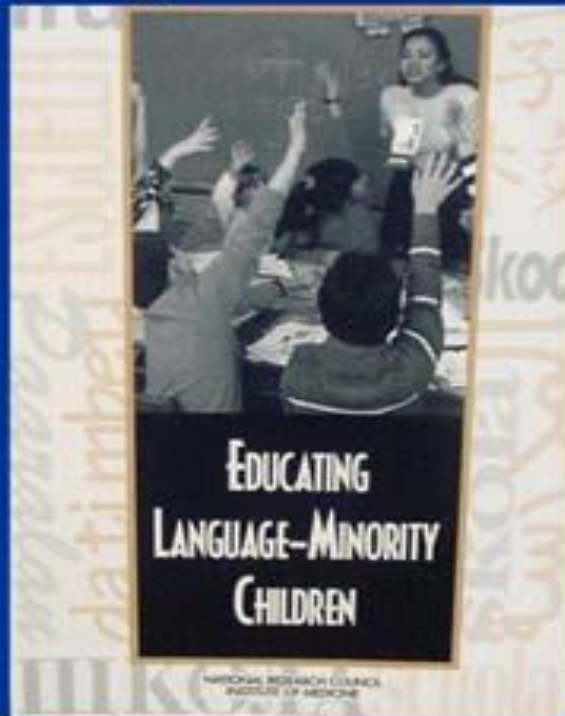
**Also must reading
for all
Elementary Teachers
and a must for
Elementary Libraries**

- ◆ High Quality Curriculum
- ◆ Sustained Professional Development
- ◆ Materials Support
- ◆ Administrative and Community Support
- ◆ Assessment and Evaluation

Resources for Second Language Learners

High Quality Curriculum

Using what we know



Science Update

Who To Contact:



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SCIENCE TEACHERS ASSO.

www.statweb.org

**Dan Lomahaftewa, artist and activist traces the basis of his work to memories of Hopi childhood and to the stories and guidance of his Choctaw mother and great-grandfather: He has exhibited extensively both in the U.S. and internationally.
email:danlomahaftewa9322@msn.com**

Art: RAINBOW GIVER

by Dan Lomahaftewa; 1996 acrylic on canvas

