

# TEA Science Update

- TEKS
- Professional Development
- Instructional Materials
- Graduation Requirements
- Assessment
- TAKS Analysis
- CCRS
- Presidential Awards
- TALA
- Available Funding
- TMSDS
- NRC Report

**CAST – GALVESTON**  
**November 3-7, 2009**

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# TEXAS ESSENTIAL KNOWLEDGE AND SKILLS (TEKS)

# Science TEKS – Revisions

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- **Adopted by SBOE in March 2009**
- **Implementation of new science TEKS in 2010-2011 school year**
- **Transition year for preparation**
- **Science TAKS and End-of-Course (EOC) exams to reflect newly adopted TEKS**

# Science TEKS – Observations

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- **More clarity and specificity in K-12**
- **Consistent K-8 themes**
  - **Scientific investigation and reasoning**
  - **Matter and energy**
  - **Force, motion, and energy**
  - **Earth and space**
  - **Organisms and environments**

# Science TEKS – Observations

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**Middle school (6-8) shifted content for grade-level focus**

- **Grade 6 – Physical science focus**
- **Grade 7 – Life science focus**
- **Grade 8 – Earth and space science focus**

# Science TEKS – Safety

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## Increased K-12 focus on safety practices

- Texas Safety Standards
- Grade level or course list of safety equipment

# Science TEKS – Equipment

## Increased K-12 focus on science equipment

- **Grade level or course list of science tools and equipment, including high school for the first time**
- **Note the “including” and “such as” statements**
- **Begin conversation on budgeting**

# Elementary Investigations

## New elementary time recommendations for classroom/outdoor investigations

- Grades K-1: At least **80%** of instructional time (“districts are encouraged to facilitate”)
- Grades 2-3: At least **60%** of instructional time (“districts are encouraged to facilitate”)
- Grades 4-5: At least **50%** of instructional time (“districts are encouraged to facilitate”)

# Middle School Investigations

## New middle school time requirements for science investigations

- Grades 6-8
- Student-conducted laboratory/field investigations for **at least 40%** of the instructional time

# High School Investigations

## **Continued high school time requirements for science investigations**

- **Grades 9-12**
- **Student-conducted laboratory/field investigations for **at least 40%** of the instructional time**

# Scientific Investigations

- Clarified importance in K-12 TEKS
- To learn about the natural world
- 3 types
  - Descriptive investigations
  - Comparative investigations
  - Experimental investigations

# Scientific Investigations

- **Descriptive investigations** involve describing and/or quantifying parts of a natural system.
- **Comparative investigations** involve collecting data on different populations/organisms, or under different conditions (e.g., times of year, locations), to make a comparison.
- **Experimental investigations** involve a process in which a “fair test” is designed in which variables are actively manipulated, controlled, and measured in an effort to gather evidence to support or refute a causal relationship.

# Career and Technical Education TEKS & Science

- CTE TEKS adopted by SBOE in July 2009
- Implementation of new CTE TEKS in 2010-2011 school year
- SBOE currently reviewing science and math CTE courses for 4<sup>th</sup> year graduation credit
  - 1<sup>st</sup> Reading – November 18-20, 2009
  - 2<sup>nd</sup> Reading/Final Adoption – January 13-15, 2010

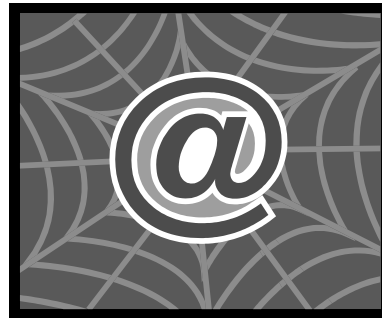
# Career and Technical Education TEKS & Science

- **CTE courses for possible science credit (19 TAC Chapter 130)**
  - **Advanced Animal Science (subchapter A)**
  - **Advanced Biotechnology (subchapter O)**
  - **Advanced Plant and Soil Science (subchapter A)**
  - **Food Science (subchapter I)**
  - **Forensics (subchapter L)**

# TEKS Web Resource

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All the latest information found



[www.tea.state.tx.us/teks/](http://www.tea.state.tx.us/teks/)

# PROFESSIONAL DEVELOPMENT

# Professional Development

## Opportunities for science educators

- **Spring and summer 2010**
  - **Trainer-of-trainer for ESCs and large districts in spring 2010**
  - **Participant training beginning in June**
- **Combination of face-to-face and online**

# Professional Development

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## Opportunities for science educators

**Includes connections to College and Career Readiness Standards (CCRS), English Language Proficiency Standards (ELPS), Gifted/Talented (G/T) Education, Special Education, and Response to Intervention (RTI)**

# Professional Development

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- **Programs include**
  - **K-12 science TEKS**
  - **5-8 Academies**
- **Designed to deepen teacher content knowledge**

# Professional Development

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## Programs include (continued)

- **Biology, Chemistry, & Physics content in preparation for EOC**
  - **Biology in summer 2010**
  - **Chemistry and Physics in 2011**

# Professional Development

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## Support for new high school science courses

- Earth and Space Science (ESS)
- Engineering

# INSTRUCTIONAL MATERIALS

# Instructional Materials

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- **Fall 2011 – Spring 2012**  
Districts select instructional materials from Proclamation 2012 (pending funding)
- **Fall 2012**  
New instructional materials in schools
- **New Legislation**  
Electronic and open source materials

# GRADUATION REQUIREMENTS

# Graduation Requirements 2009–2010

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## Current High School Juniors

### First class graduating under 4x4 Recommended HS Program

- Algebra I, Geometry, Algebra II, and 4<sup>th</sup> math credit
- Biology; two of three credits from Integrated Physics and Chemistry (IPC), Chemistry, or Physics; and 4<sup>th</sup> science credit

# Graduation Requirements 2009–2010

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**Note: graduation requirements are dependent upon the year a student enters as a 9<sup>th</sup> grader, so even if moving quickly and graduating early, 4x4 still applies.**

# Graduation Requirements and IPC

- **Minimum High School Program (MHSP)**  
Biology and IPC (or Chemistry and Physics)
- **Recommended High School Program (RHSP)**  
IPC not a science requirement option for entering 9<sup>th</sup> grade class in 2012-2013
- **Distinguished Achievement Program (DAP)**  
IPC can only count as a science elective credit

# ASSESSMENT

# Assessment Changes

## ■ Transition Plan to 2010 TEKS

- TAKS
- End-of-Course (EOC) exams

## ■ Change in Calculator Policy

- End-of-Course exams in chemistry and physics
- Spring 2010 – recommended 1 scientific or graphing calculator per student
- Spring 2011 – required 1 scientific or graphing calculator per student

# End-of-Course (EOC) Exams

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- **Success on EOC assessments becomes part of the graduation requirements beginning with the freshman class of 2011–2012.**
- **A student's score on each EOC assessment will be worth 15% of the student's final grade for the corresponding course.**
- **Details are being determined as part of Transition Plan.**

# End-of-Course Exams

## Plan for phase-out of HS TAKS and phase-in of EOC assessments

	2008– 2009	2009– 2010	2010– 2011	2011– 2012	2012– 2013	2013– 2014
Grade 9	TAKS	TAKS	TAKS	EOC	EOC	EOC
Grade 10	TAKS	TAKS	TAKS	TAKS	EOC	EOC
Grade 11	TAKS	TAKS	TAKS	TAKS	TAKS	EOC
Grade 12	TAKS*	TAKS*	TAKS*	TAKS*	TAKS*	TAKS*

\*Out-of-school testers and 12<sup>th</sup> grade re-testers

# End-of-Course Exams

## So what does this mean?

- The graduating class of 2015 (2014-15) **(students currently in grade 7)** will be the first group **required** to meet **EOC** assessment standards in order to graduate.
- Students currently in grades 8-12 must pass exit level Texas Assessment of Knowledge and Skills (TAKS) to graduate.

# SCIENCE TAKS ANALYSIS REPORTS

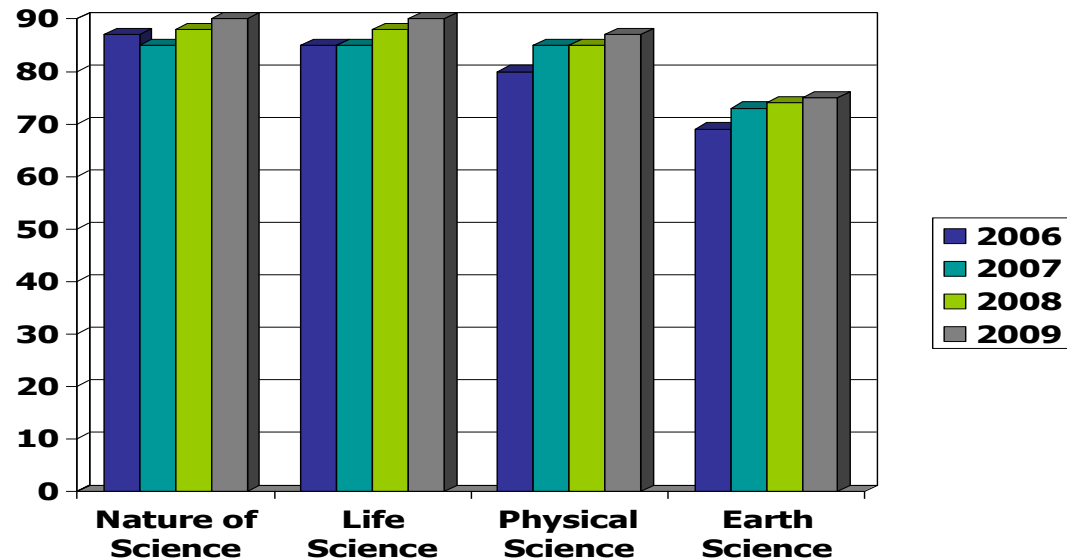
# Science TAKS Analysis Reports

## 2009 TAKS results for grades 5, 8, and 11

- Shows visual results for gender and ethnicity during a 4-year span
- Highlights the specific Student Expectations from the 2009 TAKS results that indicate a less than 70% correct response statewide (80% for grade 5 results)
- Provides correlation with each Student Expectation and the actual 2009 TAKS test items

# 2006-09 Elementary TAKS Results

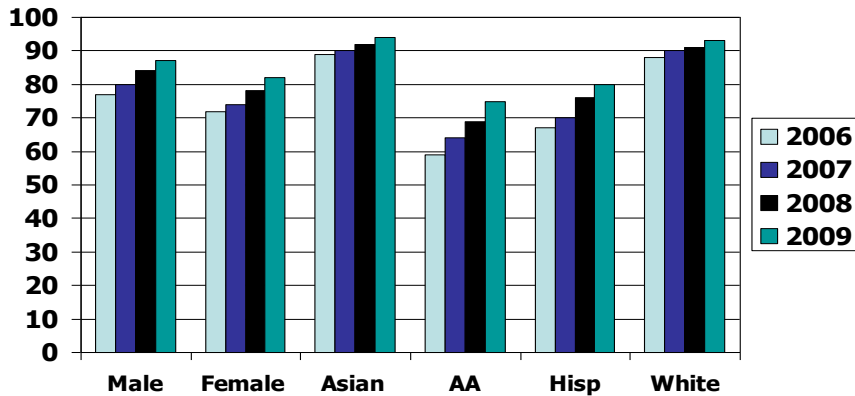
**5<sup>th</sup> Grade TAKS Items % Correct by Objectives**  
**All Students: From Spring 2006 - 2009**



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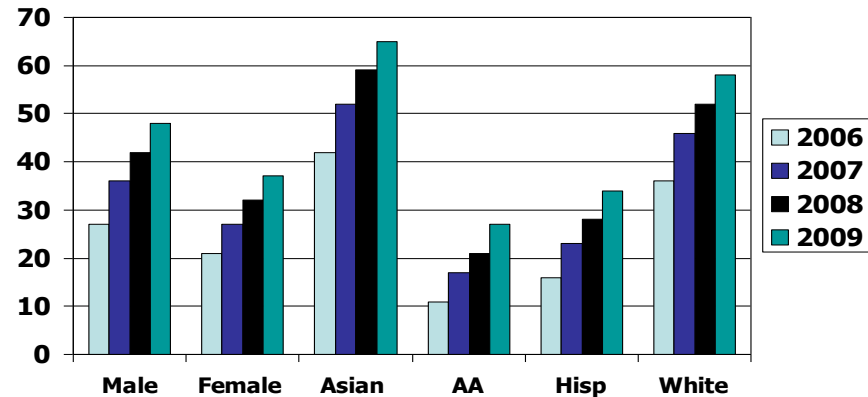
# 2006-09 Elementary TAKS Results

## 2009 Demographic Summary Grade 5 - Percent Met Standard



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## 2009 Demographic Summary Grade 5 - Percent Commended



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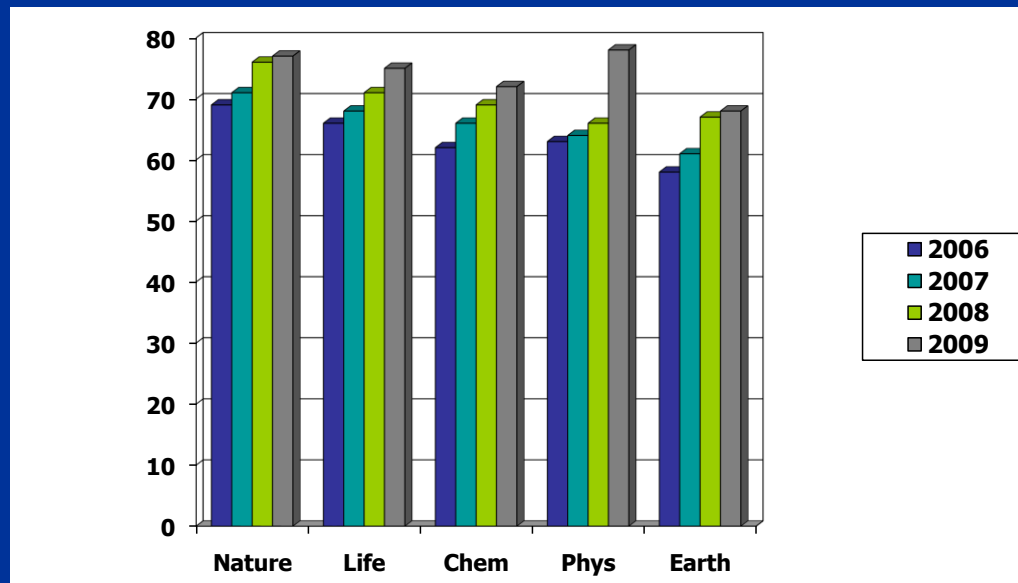
# 2009 Elementary TAKS Results

## Lowest Statewide Objective – Earth Science

<u>SE</u>	<u>%</u>	<u>Description</u>
5.5B	72%	describe some interactions that occur in a simple system
5.6B	69/79%	identify the significance of the water, carbon, and nitrogen cycles
5.11B	77%	draw conclusions about "what happened before" using data such as from tree-growth rings and sedimentary rock sequences
3.11A	71%	identify and describe the importance of earth materials including rocks, soil, water, and gases of the atmosphere in the local area and classify them as renewable, non-renewable, or inexhaustible resources
3.11D	77%	describe the characteristics of the Sun
4.11A	67%	test properties of soils including texture, capacity to retain water, and ability to support life
5.12C	75%	identify the physical characteristics of the Earth and compare them to the physical characteristics of the moon

# 2006-09 Middle School TAKS Results

8<sup>th</sup> Grade TAKS Items % Correct by Objectives  
2006 - 2009



Heydrick & Pickhardt, June 2009

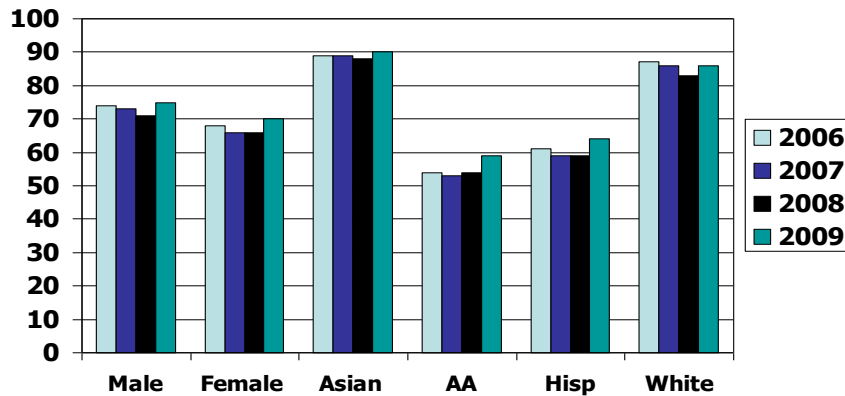
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# 2006-09 Middle School TAKS Results

## 2009 Demographic Summary

### Grade 8 - Percent Met Standard

2006-2 SEM Below, 2007-1 SEM Below, 2008-Panel Rec.



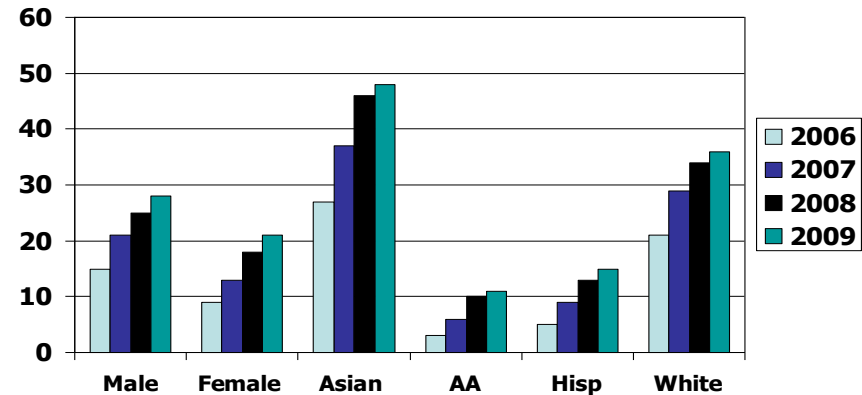
Heydrick & Pickhardt, June 2009

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## 2009 Demographic Summary

### Grade 8 - Percent Commended

2006-2 SEM Below, 2007-1 SEM Below, 2008-Panel Rec.



Heydrick & Pickhardt, June 2009

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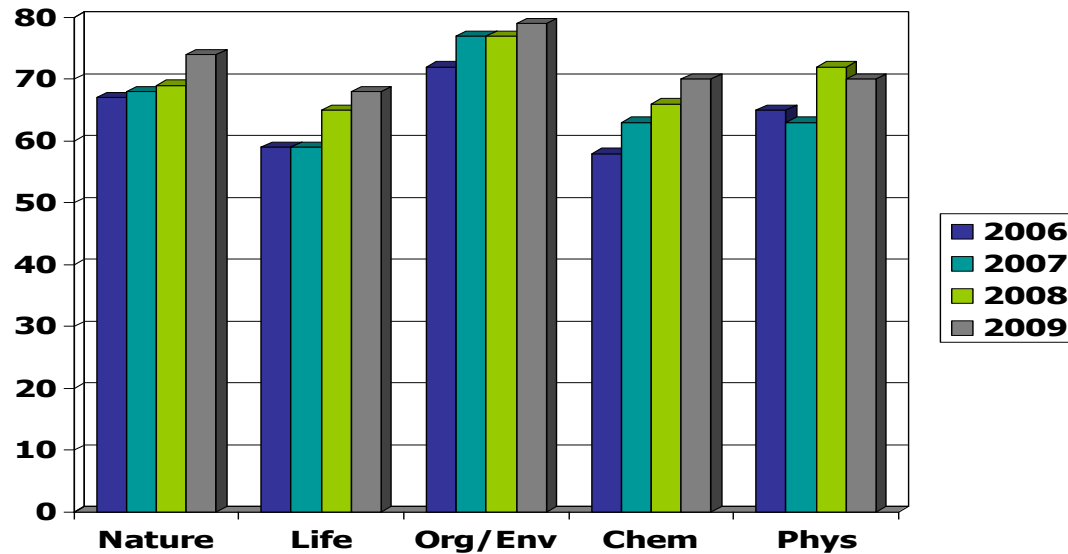
# 2009 Middle School TAKS Results

## Lowest Statewide Objective – Earth Science

<u>SE</u>	<u>%</u>	<u>Description</u>
7.13B	57%	relate the Earth's movement and the moon's orbit to the observed cyclical phases of the moon
7.14B	57%	analyze effects of regional erosional deposition and weathering
8.10B	57%	describe interactions among solar, weather, and ocean systems
8.12A	61%	analyze and predict the sequence of events in the lunar and rock cycles
8.14B	53%	analyze how natural or human events may have contributed to the extinction of some species
8.14C	68%	describe how human activities have modified soil, water, and air quality

# 2006-09 11<sup>th</sup> Gr. Exit TAKS Results

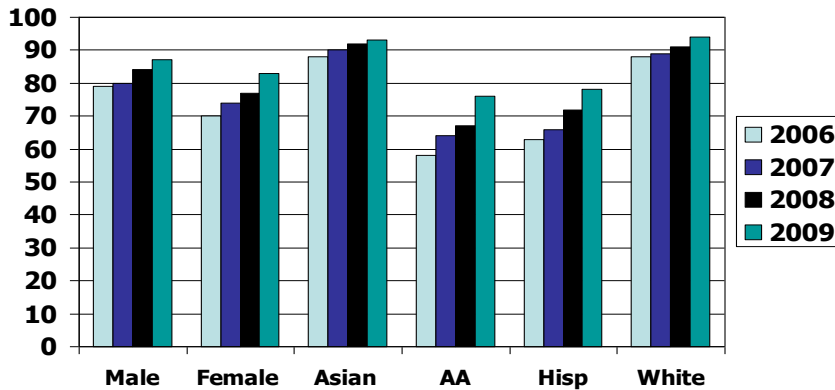
11<sup>th</sup> Grade TAKS Items % Correct by Objectives  
2006 - 2009



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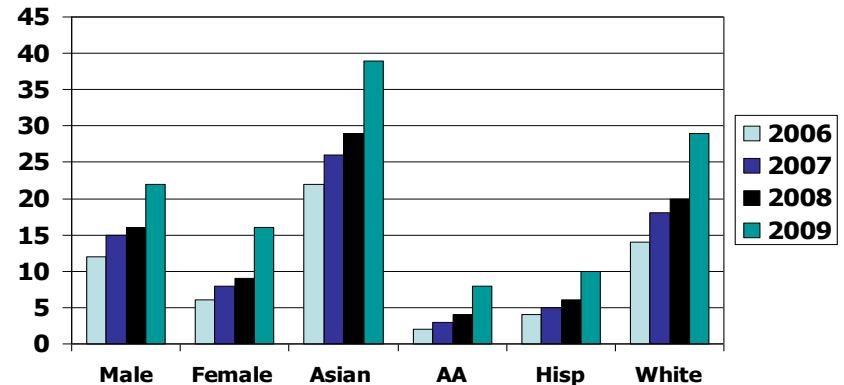
# 2006-09 11<sup>th</sup> Gr. Exit TAKS Results

## 2009 Demographic Summary Grade 11 - Percent Met Standard



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## 2009 Demographic Summary Grade 11 - Percent Commended



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# 2009 11<sup>th</sup> Grade TAKS Results

## Lowest Statewide Objectives – **Chemistry** & Physics

<u>SE</u>	<u>%</u>	<u>Description</u>
IPC 7A	53/55%	recognize that waves are generated and can travel through different media
IPC 8C	44/85%	investigate and identify the law of conservation of mass
IPC 9A	59/68%	relate the structure of water to its function [as the universal solvent]
IPC 9B	63%	relate the concentration of ions in a solution to physical and chemical properties such as pH, electrolytic behavior, and reactivity

# 2009 11<sup>th</sup> Grade TAKS Results

## Lowest Statewide Objective – Chemistry & Physics

<u>SE</u>	<u>%</u>	<u>Description</u>
IPC 4B	68/90%	investigate and describe [applications of] Newton's laws such as in vehicle restraints, sports activities, geological processes, and satellite orbits.
IPC 4D	55%	investigate and demonstrate [mechanical advantage and] efficiency of various machines such as levers, motors, wheels and axles, pulleys, and ramps.
IPC 5B	44%	demonstrate wave interactions including interference, polarization, reflection, refraction, and resonance within various materials.
IPC 6A	60/74%	describe the law of conservation of energy
IPC 6B	55%	investigate and demonstrate the movement of heat through solids, liquids, and gases by convection, conduction, and radiation

# Summary

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- **Need to reduce the achievement gap between genders**
- **Need to reduce the achievement gap among African American, Hispanic, and white students**
- **Commit to teach all the TEKS for each grade/course**
- **Focus attention on Earth and space science concepts**

# COLLEGE AND CAREER READINESS STANDARDS (CCRS)

# College and Career Readiness

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## Phase III: Develop Instructional Strategies and Support Materials

**Science CCRS Online Student Materials  
available during the fall semester of 2011**

# College and Career Readiness

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## Phase III: Educator Support Web Portal

- Provides Q&A and Updates
- Instructional Strategies
- Professional Development

# **PRESIDENTIAL AWARDS FOR EXCELLENCE IN MATHEMATICS AND SCIENCE TEACHING (PAEMST)**

# Presidential Awards (PAEMST)

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- **The highest recognition that a kindergarten through 12th-grade mathematics or science teacher may receive for outstanding teaching in the United States**
- **Nominations now open**
- **Applications are due by May 1, 2010**
- **This year: K-6 teachers**

# Presidential Awards (PAEMST)

## Who is Eligible?

- Have at least 5 years of teaching experience prior to application
- Teach mathematics or science at the K-6 level in a public or private school.
- Be full-time employees of the school or school district
- Be highly qualified teachers, as deemed by their states, districts, or schools
- Hold a degree or appropriate credentials in the category for which they are applying
- Teach in one of the 50 states or four U.S. jurisdictions
- Not have received the national PAEMST award in any prior competition or category

# Presidential Awards (PAEMST)

- The National Science Foundation, under the direction of the White House, approves the Texas candidates as finalists for the national PAEMST award. If chosen as a national winner, the state finalists will receive \$10,000 and an all-expense-paid trip for two to Washington D.C. for ceremonies that include recognition from the President of the United States at the Capital.
- Nominations Due April 1, 2010
- Applications Due May 1, 2010
- More information at [www.PAEMST.org](http://www.PAEMST.org)



# Presidential Awards (PAEMST)

## 2009 Texas Secondary Science Finalists – Science

- **Mila Bersabal** is a high school physics teacher from Lee High School, Houston, who has 18 years of teaching experience.
- **Michele Mann** is a high school biology teacher from Vista Ridge High School, Cedar Park, who has 10 years of teaching experience.
- **Stef Paramoure** is an 8<sup>th</sup> grade science teacher from Canyon Middle School, New Braunfels, who has 7 years of teaching experience.



# TEXAS ADOLESCENT LITERACY ACADEMIES (TALA) INITIATIVE

# TALA

- **The TALA initiative exists to increase academic literacy among middle school students by providing research-based professional development to middle school teachers.**
- **Two types of academies:**
  - **English Language Arts (ELA) Academy (for English language arts/reading teachers) – 4 days**
  - **Content Area Academy (for mathematics, science, and social studies teachers) – 2 days**

# TALA

## Who can attend the Content Academies?

**Certified, full-time teachers who will teach mathematics, science, and/or social studies at least 50% of their day and teach students in grade 6 (2008-2009) and grades 7-8 (2009-2010) at least 50% of their day, including teachers in general education, special education or English as a second language education**

# TALA

- Teachers attending the Content Academy will receive a \$250 stipend and 12 Continuing Professional Education (CPE) credits for completion.
- Information is available at <http://ritter.tea.state.tx.us/tala/index.html>.

# AVAILABLE FUNDING

# Available Funding

## Student Success Initiative Grants for Districts

- Funds for any content area in grades K-12
- Application available October 26, 2009
- Application due by November 20, 2009
- <http://www.tea.state.tx.us/index2.aspx?id=6586>

# Available Funding

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## Master Grant Program

- Only districts with existing master teachers
- Stipend grant requests due by June 30, 2010
- <http://www.tea.state.tx.us/masterteacher.aspx>

# TEXAS MATHEMATICS AND SCIENCE DIAGNOSTIC SYSTEM

# TMSDS Features

- **Science component: Grades 3-8 and IPC, Biology, Chemistry, and Physics**
- **3 diagnostic tests available for each grade level/course – 30 questions each**
- **5-question “mini-assessments” available for most student expectations for each grade level/course**

# New TMSDS Features

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- **Grade 3 Science**
- **Pre-load** class and user data
- **35 pre-configured quizzes** per grade/subject
- **English *and* Spanish** available
- **Skill resources** for Math

# Spanish Items Available for Diagnostics & Minis

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- **Grades 3-8**
- **Biology**
- **Chemistry**
- **Physics**
- **IPC**

# A Free Resource for You



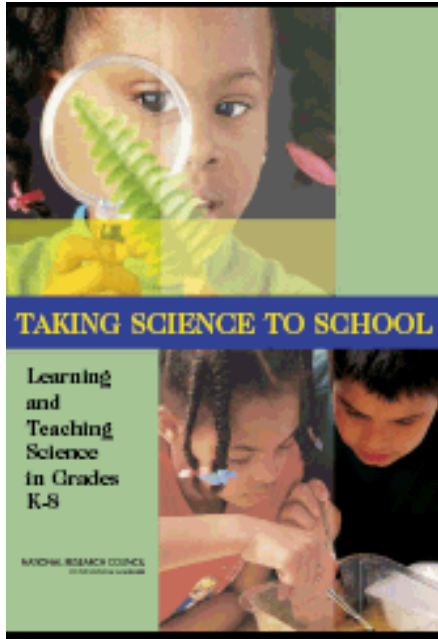
Texas Mathematics and  
Science Diagnostic System



[www.tmsds.org](http://www.tmsds.org)

# NATIONAL RESEARCH COUNCIL REPORT “TAKING SCIENCE TO SCHOOL”

# Taking Science to School (2007)

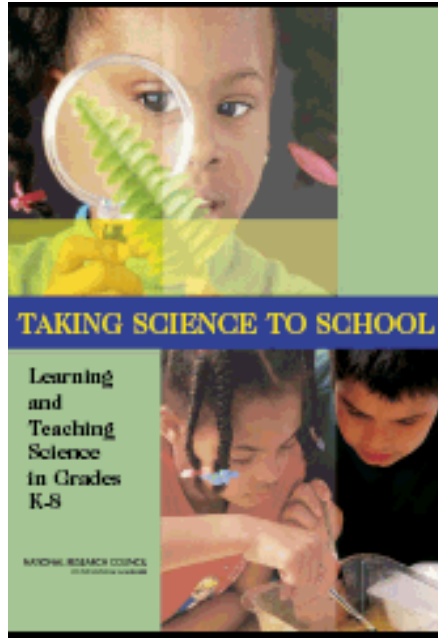


This important report claims that students who are proficient in science should be expected to

1. know, use, and interpret scientific explanations of the natural world;
2. generate and evaluate scientific evidence and explanations;
3. understand the nature and development of scientific knowledge; and
4. participate productively in scientific practices and discourse.

Each of the above four strands of science education are judged to be of equal importance!

# Taking Science to School (2007)



Note that strands 2 and 4 can **ONLY** be taught through active inquiry!

1. Know, use, and interpret scientific explanations of the natural world
2. **Generate and evaluate scientific evidence and explanations**
3. Understand the nature and development of scientific knowledge
4. **Participate productively in scientific practices and discourse**

# We Need You!

Sign up for the Science  
and Assessment Listservs

[www.tea.state.tx.us/list/](http://www.tea.state.tx.us/list/)



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**Thank you. We appreciate your service to children.**

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