The National Academies of SCIENCES ENGINEERING MEDICINE

BOARD ON SCIENCE EDUCATION

Taking Stock of Science Standards Implementation: A Summit

Day 1

Sponsor: Bill & Melinda Gates Foundation

Reminder: Policy on Preventing Discrimination, Harassment, and Bullying

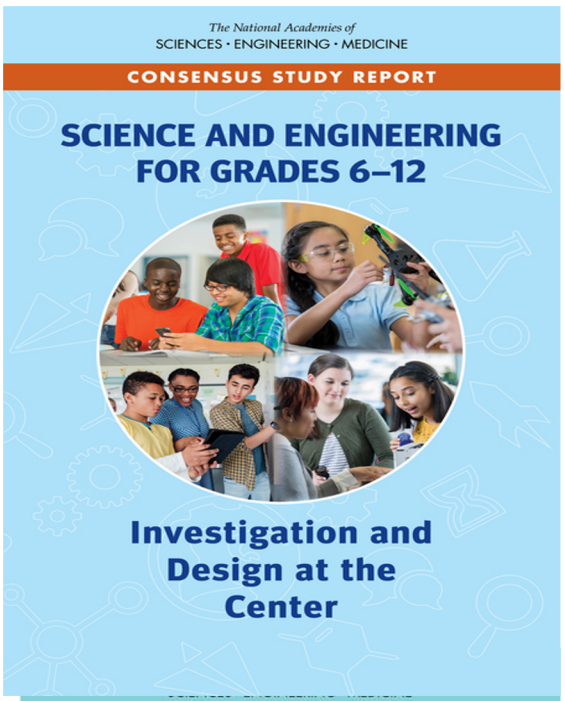
- Maintain a work environment free of harassment and intimidation
- Shared responsibility not to commit harassing or discriminatory acts, not to tolerate or ignore those of others, and to avoid knowingly placing others in situations where they may be harassed
- Compliance required in all settings at the National Academies in which work is performed
- Report any incident of harassment, discrimination, or bullying to NASEM staff

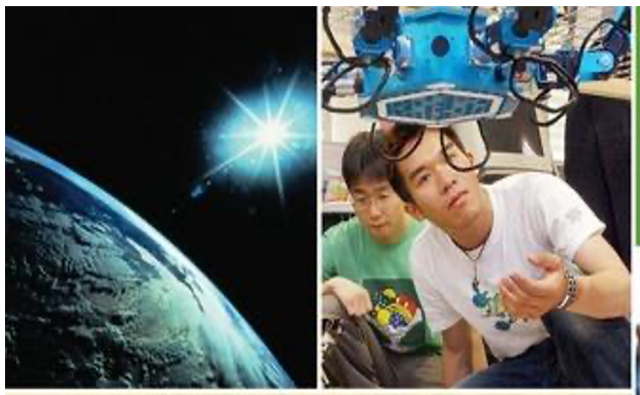
Norms for Participation

- Embrace diversity
  - Differences in opinion are welcomed
  - Be open, listen and respectfully
- Strive to promote an inclusive environment where everyone feels welcomed, valued, respected, and supported
  - Be constructive in your comments
  - Bullying behavior will not be tolerated

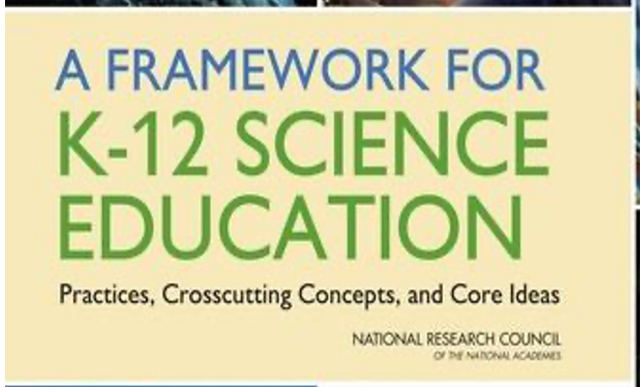
A word from our Sponsor

Taunya Nesin, Senior Program Officer
Bill & Melinda Gates Foundation

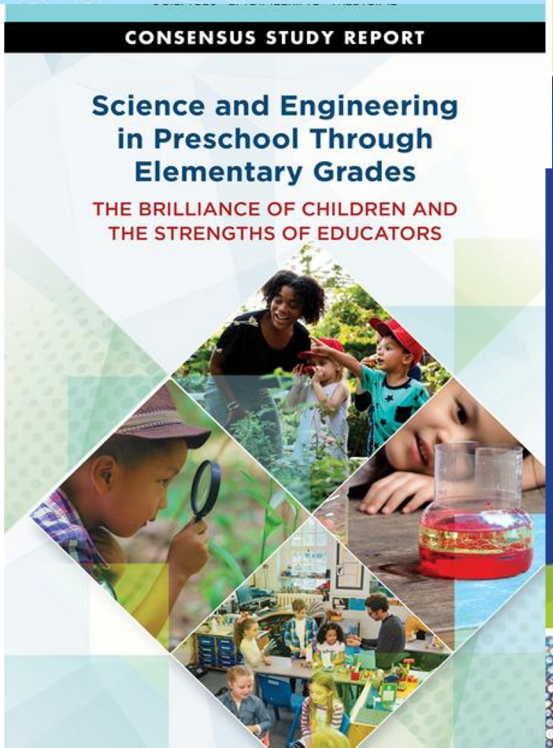

The National Academies of
SCIENCES • ENGINEERING • MEDICINE
CONSENSUS STUDY REPORT
SCIENCE AND ENGINEERING FOR GRADES 6–12
Investigation and Design at the Center

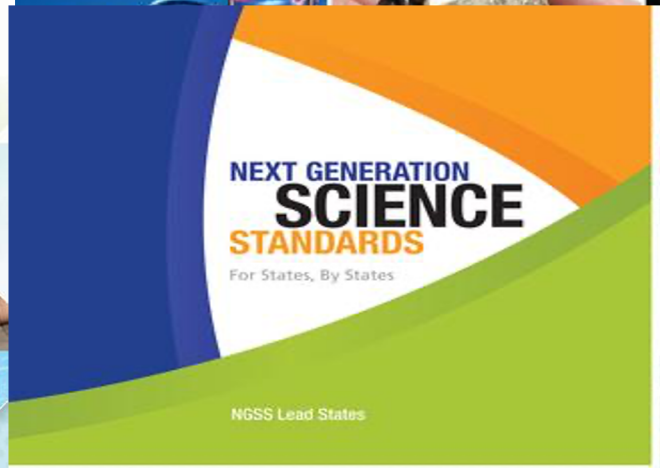



DEVELOPING ASSESSMENTS FOR THE NEXT GENERATION SCIENCE STANDARDS
NATIONAL RESEARCH COUNCIL


A FRAMEWORK FOR
K-12 SCIENCE EDUCATION
Practices, Crosscutting Concepts, and Core Ideas
NATIONAL RESEARCH COUNCIL


GUIDE TO IMPLEMENTING
THE NEXT GENERATION SCIENCE STANDARDS
PROCEEDINGS OF A WORKSHOP


CONSENSUS STUDY REPORT
Science and Engineering in Preschool Through Elementary Grades
THE BRILLIANCE OF CHILDREN AND THE STRENGTHS OF EDUCATORS


NEXT GENERATION SCIENCE STANDARDS
For States, By States
NGSS Lead States


Design, Selection, and Implementation of Instructional Materials for the Next Generation Science Standards


The National Academies of
SCIENCES • ENGINEERING • MEDICINE

Objectives

- Understand the current state of science standards implementation.
- Determine what criteria and indicators are guiding schools, districts, and states in their implementation efforts.
- Identify the tools, resources, and capital needed to advance a more just, equitable, and inclusive learning experience for our youth, teachers, and communities.
- Identify what needs to happen in the next phase of implementation.

Stocktake Design

Virtual Meetings

- Panel Discussions
- Researcher and Practitioner Input
- Reflection on Current Landscape

Community Engagements

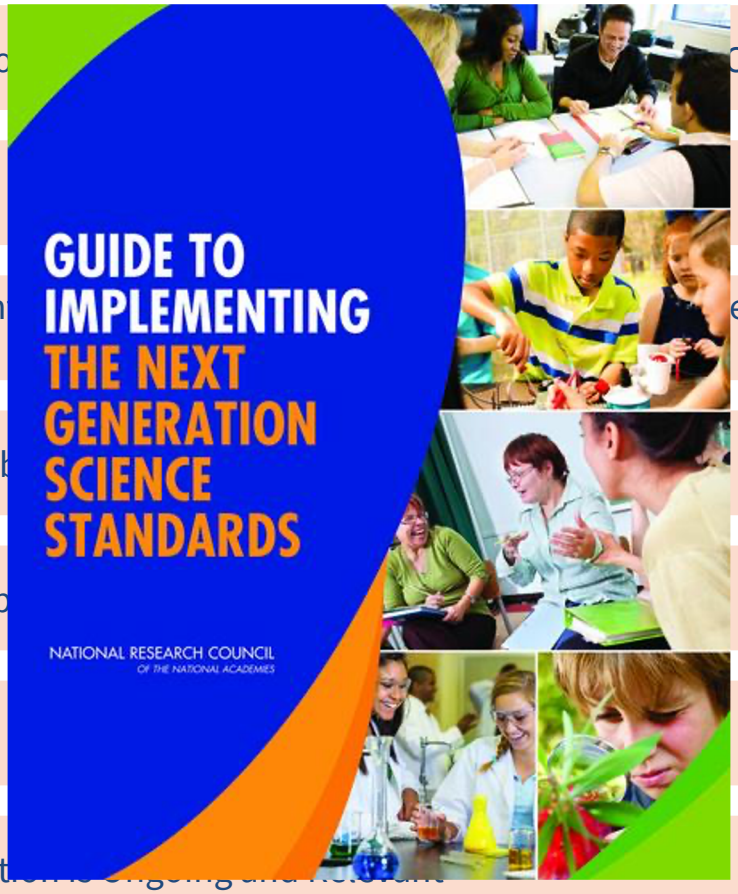
- Listening Sessions
- Follow-up Conversations w Community Organizations

Next Steps

- Review papers and meeting reports
- Community Planning

Revisiting Principles for Implementation

- Attend to Coherence Acro Components of the System
- Attend to What Is Unique
- Develop and Provide Con e State, District, and School Levels
- Build and Leverage Collab
- Take Enough Time to Imp
- Make Equity a Priority
- Ensure That Communicat



National Research Council. 2015. *Guide to Implementing the Next Generation Science Standards*. Washington, DC: The National Academies Press.https://doi.org/10.17226/18802.

The National Academies of SCIENCES ENGINEERING MEDICINE

Meeting Design Elements

Make Equity a Priority

Attend to Coherence

- Student Learning Experiences
- Professional Learning
- Curriculum
- Assessment
- Infrastructure

Agenda Preview

Agenda

Plenary: *From Vision to Reality*

11:30 am – 12:40 pm ET

Panel: *Landscape of Implementation*

1:15 pm – 2:15 pm ET

Panel: *The Role of Leadership*

3:00 pm – 4:00 pm ET

Open Discussion: *Reflection*

4:00 – 4:30 pm ET

Norms for Engagement

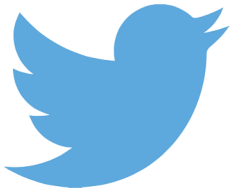
Audio	Make sure that you are always muted.	Please listen generously and respectfully.
Chat	We encourage active engagement in the chat.	Be respectful.
Q & A Box	Please enter your questions for panelists here.	We will **NOT** be scanning the chat for questions.
Slido	Polls have been incorporated throughout the event.	We will **NOT** be using the Q&A function.

Let's try a few polls! The chat includes the link to Slido.

Get Social

The event will be using the hashtag #scistandards on twitter, so we encourage you to follow, join and stay engaged in the conversation.

Or join us for the #sciencestandardsslowchat



From Vision to Reality

Moderator: Heidi Schweingruber
NASEM

Panelist: Philip Bell
University of Washington

Panelist: Betsy Davis
University of Michigan

Panelist: Stephen Pruitt
Southern Regional Education Board

Panelist: Michael Lach
Assistant Superintendent

Panelist: Tiffany Neill
Oklahoma State Dept of Ed

The National Academies of | SCIENCES ENGINEERING MEDICINE

We are heading to break. We will return at 1:15 pm ET.

Don't forget to complete the poll in Slido!

Word Cloud Results:
Biggest Challenge for Implementation

The Landscape of Implementation

Moderator: Maya M.Garcia
Colorado Dept of Ed

Panelist: Stefanie Marshall
University of Minnesota

Panelist: Jim Spillane
Northwestern University

Panelist: Bill Penuel
University of Colorado Boulder

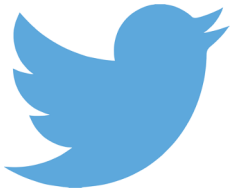
Panelist: Jenny Sarna
NextGenScience WestEd

The National Academies of | SCIENCES ENGINEERING MEDICINE

We are heading to break. We will return at 3:00 pm ET.

Get Social

The event will be using the hashtag #scistandards on twitter, so we encourage you to follow, join and stay engaged in the conversation.



The Role(s) of Leadership

Moderator: James Blake
Lincoln Public Schools

Panelist: Mike Heinz
NJ Dept of Ed, CSSS-Pres

Panelist: Elizabeth Mulkerrin
Omaha Zoo & Aquarium, NSTA Pres Elect

Panelist: Zoe Evans
Bowden High School

Panelist: Gudiel Crosthwaite
Lynwood Unified School District

Panelist: Takako Olson
Lincoln Public Schools

The National Academies of | SCIENCES ENGINEERING MEDICINE

Unfortunately, there is a large achievement gap for English Learners across the state of California.

44% vs 12%

Percent of non-ELs vs percent of ELs who were **proficient in math** in Grades 3-8 Summative Assessments in California .

87% vs 68%

Percent of students in CA vs percent of ELs in CA who **graduated high school on time**.

Source: California Department of Education DataQuest: https://www.cde.ca.gov/ds/sg/englishlearner.asp

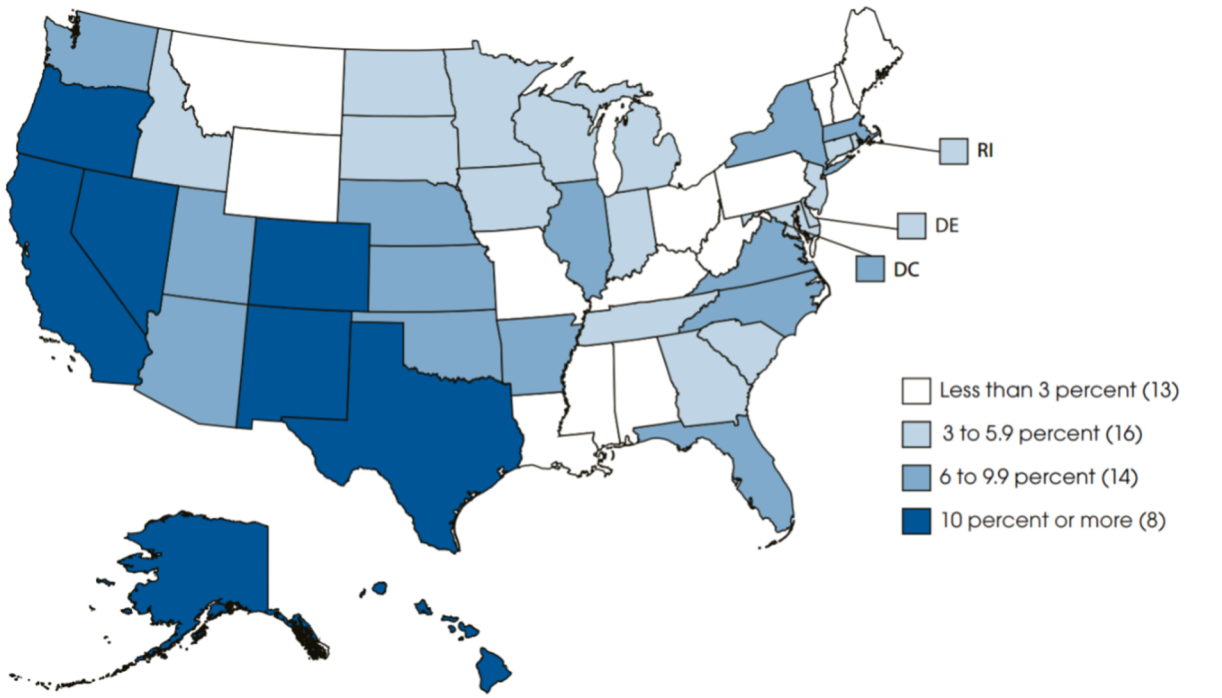
In Fall 2015,

4.9 Million

public school students were identified as English learners

English Learners are fastest growing population.

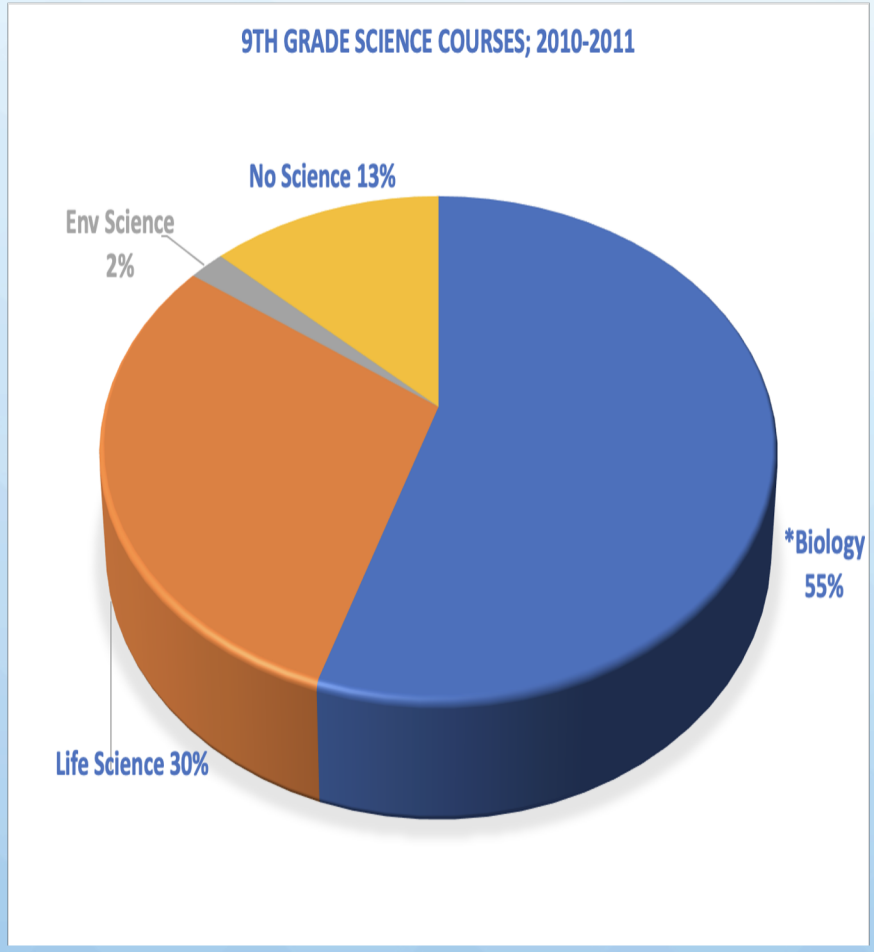
Figure 1. Percentage of public school students who are English language learners (ELL), by state: School year 2010–11

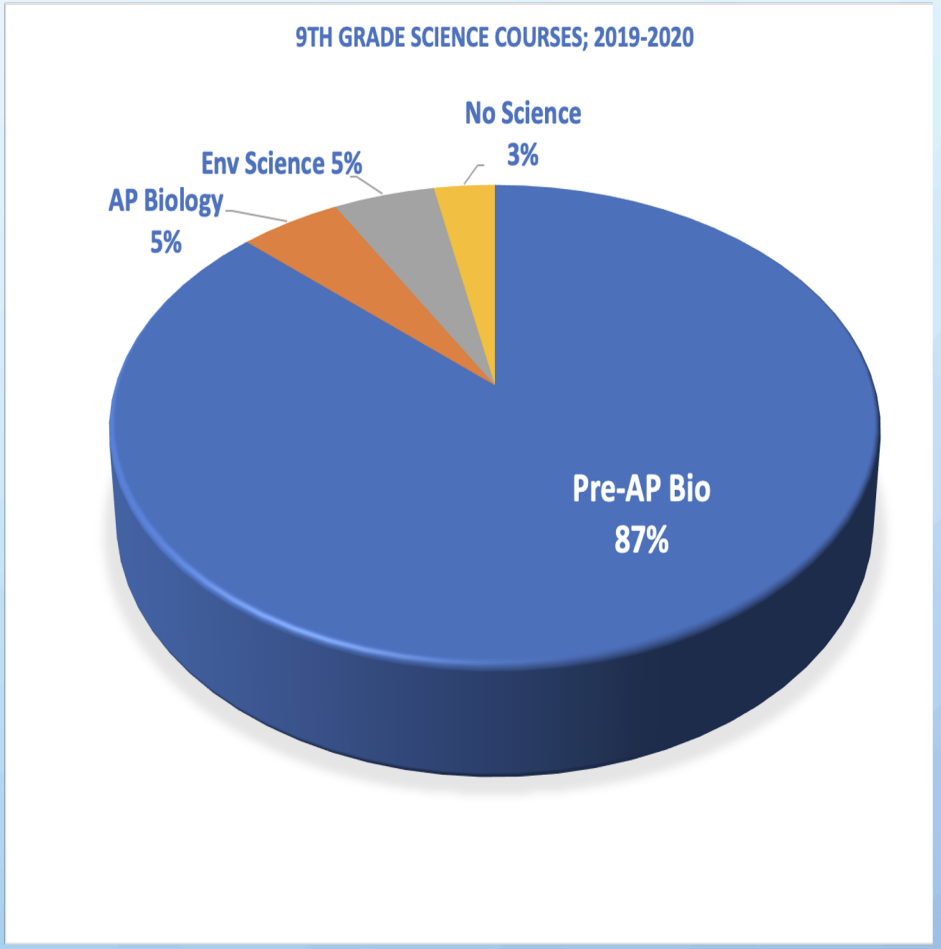


SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "Local Education Agency School Universe Survey," 2010–11. See *Digest of Education Statistics 2012*, table 47.

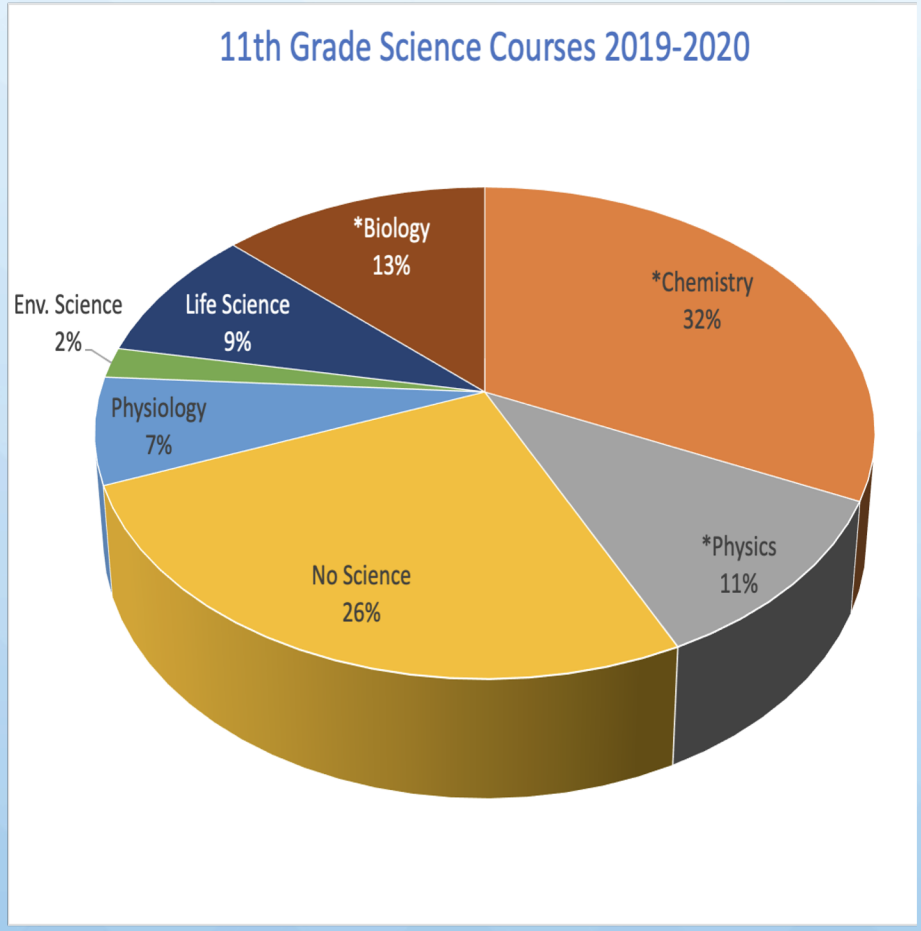
Map from nces.ed.gov

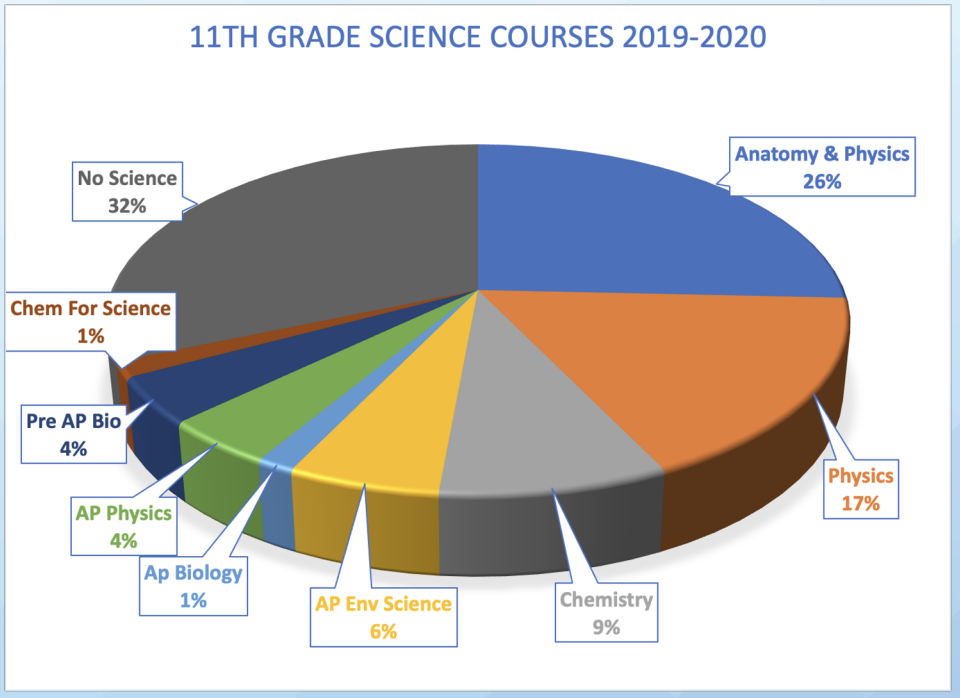
9th Grade Science





11th Grade Science





Word Cloud Results:
Biggest Challenge for Implementation

Chat Question

What is one insight you had today?
Or one new thing you learned?

Reflections on the Day

That's a wrap!

Thank you for your participation throughout the day. We look forward to seeing everyone again tomorrow where we will dig into Centering Student Experiences and Teacher Professional Learning!

The National Academies of SCIENCES ENGINEERING MEDICINE

BOARD ON SCIENCE EDUCATION

Taking Stock of Science Standards Implementation: A Summit

Day 2

Sponsor: Bill & Melinda Gates Foundation

Norms for Participation

- Embrace diversity
  - Differences in opinion are welcomed
  - Be open, listen and respectfully
- Strive to promote an inclusive environment where everyone feels welcomed, valued, respected, and supported
  - Be constructive in your comments
  - Bullying behavior will not be tolerated

Reminder: Policy on Preventing Discrimination, Harassment, and Bullying

- Maintain a work environment free of harassment and intimidation
- Shared responsibility not to commit harassing or discriminatory acts, not to tolerate or ignore those of others, and to avoid knowingly placing others in situations where they may be harassed
- Compliance required in all settings at the National Academies in which work is performed
- Report any incident of harassment, discrimination, or bullying to NASEM staff

Committee Members

Aneesha Badrinarayan
Learning Policy Institute

James Blake
Lincoln Public Schools

Ravit Duncan
Rutgers University

Maya M. Garcia - Chair
Colorado Department of Education

Jessica Henderson-Rockette
Instruction Partners

Victor Sampson
University of Texas, Austin

Sam Shaw
Ed Reports

Tricia Shelton
NSTA

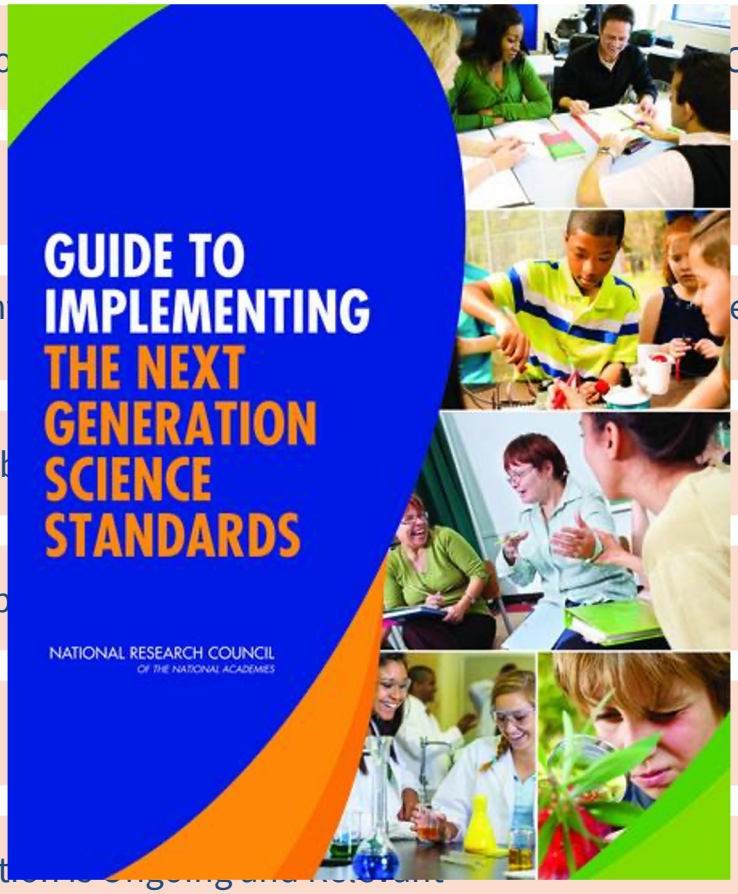
The National Academies of | SCIENCES ENGINEERING MEDICINE

Objectives

- Understand the current state of science standards implementation.
- Determine what criteria and indicators are guiding schools, districts, and states in their implementation efforts.
- Identify the tools, resources, and capital needed to advance a more just, equitable, and inclusive learning experience for our youth, teachers, and communities.
- Identify what needs to happen in the next phase of implementation.

Revisiting Principles for Implementation

- Attend to Coherence Acro Components of the System
- Attend to What Is Unique
- Develop and Provide Con e State, District, and School Levels
- Build and Leverage Collab
- Take Enough Time to Imp
- Make Equity a Priority
- Ensure That Communicat



National Research Council. 2015. *Guide to Implementing the Next Generation Science Standards*. Washington, DC: The National Academies Press.https://doi.org/10.17226/18802.

The National Academies of SCIENCES ENGINEERING MEDICINE

Meeting Design Elements

Make Equity a Priority

Attend to Coherence

- Student Learning Experiences
- Professional Learning
- Curriculum
- Assessment
- Infrastructure

Welcome and Overview

Agenda

Panel: *Centering Student Experience in Science*

11:15 am – 12:20 pm ET

Presentation and Panel: *Teacher Professional Learning*

1:00 pm – 3:45 pm ET

- NSTA Survey: Setting the Stage
  1:00 – 1:15 pm ET
- Teacher Education Preparation Panel
  1:15 – 2:05 pm ET
- Teacher Professional Development
  2:15 – 3:05 pm ET
- Cross Panel Discussion
  3:05 - 3:45 pm ET

Open Discussion: *Reflection*

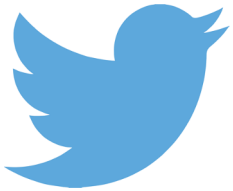
4:00 – 4:30 pm ET

Norms for Participation

Audio	Make sure that you are always muted.	Please listen generously and respectfully.
Chat	We encourage active engagement in the chat.	Be respectful.
Q & A Box	Please enter your questions for panelists here.	We will **NOT** be scanning the chat for questions.
Slido	Polls have been incorporated throughout the event.	Participation is encouraged, not required.

Get Social

The event will be using the hashtag #scistandards on twitter, so we encourage you to follow, join and stay engaged in the conversation.



Chat Question

What is one wondering you have going into Day 2?

Centering Student Experience in Science

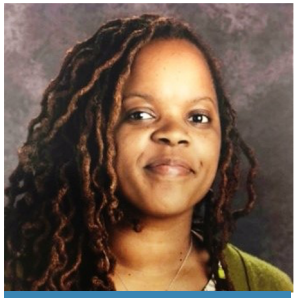
Moderator:
Ravit Duncan
Rutgers University

Panelist:
Lauren Kaupp
State of Hawaii Dept of Ed

Panelist:
Edna Tan
University of NC Greensboro

Panelist:
Maria Olivares
Boston University

Panelist:
Enrique Suárez
University of Mass Amherst



Panelist:
Rabiah Harris
Ida B. Wells Middle School

The National Academies of | SCIENCES ENGINEERING MEDICINE

"[A] major goal for science education should be to provide all students with the background to systematically investigate ***issues related to their personal and community priorities***. They should be able to frame scientific questions ***pertinent to their interests***, conduct investigations and seek out relevant scientific arguments and data..."

— A *Framework for K-12 Science Education* (p. 278)

Student voices…

"When you walk into some classrooms, you feel they don't want you there." (Sana, 13-year-old)

…ereotype is that Black people are not listening to science. But that is not true. Maybe it's the other way around, like science is not listening to us.... I want you to know how I feel as a young, Black girl in America and in STEM. I want to feel like I can be me in STEM and have that celebrated." (Jazmyn, 15 years old)

"Teachers care, but they do not care about the community all of the time. We go outside on our time, and find places where we can go do science or engineering for our communities. School doesn't know how to do that. School doesn't know that we do that. We need to tell our teachers how we do it. We got to help them." (Samuel, 14 years old)

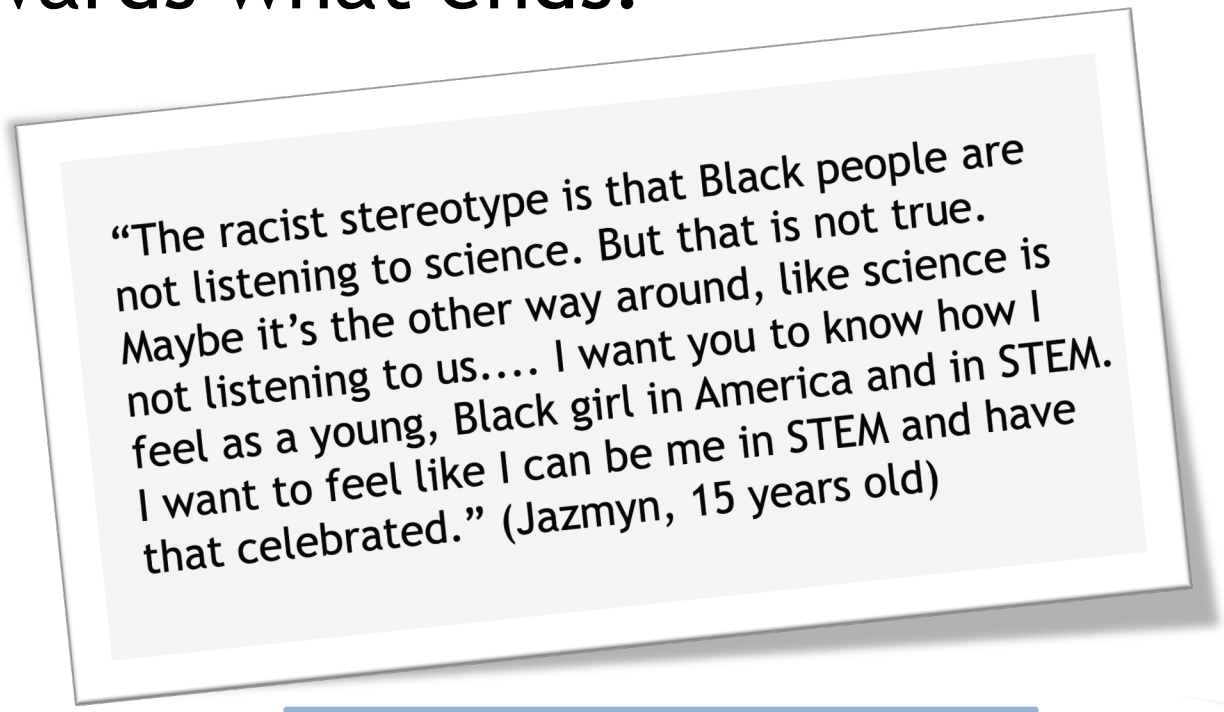
Calabrese Barton, A., & Tan. E. (2021). Designing for social justice in science teaching and learning: Working towards rightful presence. *NSTA Blog*.

Calabrese Barton, A., & Tan. E. (2020). Beyond equity as inclusion: A framework of 'rightful presence' for guiding justice-oriented studies in teaching and learning. *Educational Researcher* 49 (6).

Calabrese Barton, A., Tan, E., & Birmingham, D. J. (2020). Rethinking high-leverage practices in justice-oriented ways. *Journal of Teacher Education*, *71*(4), 477-494.

Centering Student Experience

- Whose experience are we centering?
- How and when are we centering them?
- Towards what ends?



Calabrese Barton, A., & Tan. E. (2021). Designing for social justice in science teaching and learning: Working towards rightful presence. *NSTA Blog*.

Chat Question

What strategies have you seen or have you used to center the student experience?

We are heading to break. We will return at 1:00 pm ET.

Setting the Stage

- Teachers were asked:
  - What are the main challenges in implementing science standards in ways that connect science to students and their home communities?
  - What are important messages to send to leaders?
  - What are important features of excellent science instruction?

Participants

- N = 197
  - PreK-5 = 28
  - PreK-8 = 9
  - PreK-12 = 20
  - Middle = 33
  - Middle/High = 17
  - High = 69
  - College = 21

Biggest Challenges

Elementary Grades

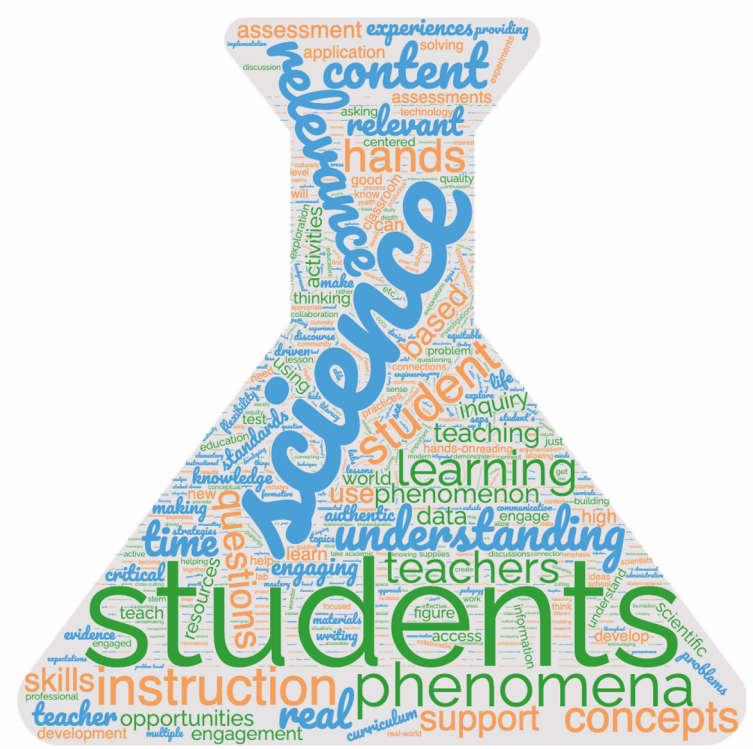
Middle/High School

Important Messages for Leaders

1. Science is important/should be a priority
2. Professional learning is needed
3. Resources/Teacher Supports (tied)
4. Time (planning & in schedule)
5. Funding
6. Alignment & coherence of materials
7. Assessments
8. Emphasis on 3D learning

Features of Excellent Instruction

1. Hands-on/Inquiry Based
2. Relevant to local community & student's lives
3. Phenomenon-based
4. Student-centered
5. Emphasis on practices
6. Knowledgeable teachers
7. Collaboration



The National Academies of SCIENCES ENGINEERING MEDICINE

Teacher Educator Preparation

Panelist:
Thomas Philip
University of California, Berkeley

Panelist:
Melissa Braaten
University of Colorado Boulder

Panelist: Lizette Burks
University of Houston-Downtown

Panelist:
Todd Campbell
University of Connecticut

Moderator:
Victor Sampson
University of Texas at Austin

The National Academies of | SCIENCES ENGINEERING MEDICINE

Quick stretch break.
We will return at 2:15 pm ET.

Teacher Professional Development

Moderator

Tricia Shelton
NSTA

Panelist

Jody Bintz
BSCS Science Learning

Panelist

K. Renae Pullen
Caddo Parish Public Schools

Panelist

Breigh Rainey Rhodes
Louisiana Dept of Ed

Panelist

Stacey van der Veen
Leadership in Science, LLC

Panelist

Julie Yu
Exploratorium

The National Academies of | SCIENCES ENGINEERING MEDICINE

Teacher Professional Learning Full Panel Discussion/Q&A


Thomas Philip


Melissa Braaten


Lizette Burks


Todd Campbell


Jody Bintz


K. Renae Pullen


Breigh Rainey Rhodes


Stacey van der Veen


Julie Yu


Moderator: Victor Sampson

The National Academies of SCIENCES ENGINEERING MEDICINE

We are heading to brief break.
We will return at 4:00 pm ET.

Reflections on the Day

Chat Question

What is one insight, strategy, new idea that you will take back to your classroom, school, district, organization …

That's a wrap!

Thank you for your participation throughout the day. We hope to see everyone again December 8th in which we will dig into curriculum/instructional materials, assessment, and tools/resources!