Appendix D: “All Standards, All Students”
Making Next Generation Science Standards Accessible to All Students

Deborah Peek-Brown, University of Michigan
Betty Crowder, MSTA, Oakland University
All Standards, All Students

WHAT DOES IT MEAN TO YOU?
Components

• **Learning opportunities and challenges** that NGSS presents to particular learning groups.

• **Effective strategies for implementation** of NGSS in the science classroom, school, home and community.

• **Context of student diversity** by addressing changing demographics, achievement gaps, and educational policies addressing non-dominant groups.
Student Diversity

Four Accountability Groups as defined by NCLB and ESEA:

• economically disadvantaged students,
• students from major racial and ethnic groups,
• students with disabilities, and
• students with limited English proficiency

Student diversity is extended by adding three groups:

• gender,
• students in alternative education programs, and
• gifted and talented students.
Context

What are the contexts that influence student learning by diverse student groups?

• Student demographics
• Student achievement
• Educational policies
Demographics: Economically Disadvantaged Students

- 21.6% of children in the U.S. live in poverty (U.S. Census Bureau, 2011), the highest poverty rate since survey began in 2001.
  - Black at 38.2%, Hispanic at 32.3%, White at 17% and Asian at 13%
  - 48% of students eligible for free or reduced lunch in 2010-2011 (Common Core of Data)
- 48% of Michigan children eligible for free or reduced lunch in 2011-12 compared to 36% in 2008 (Michigan League for Public Policy)
Demographics: Students from Major Racial or Ethnic Minority Groups

• According to the 2012 U.S. Census:
  • **36% of the U.S. population are minorities** (16% Hispanic, 13% Black, 5% Asian, 1% Native American)
  • 45% of under 19 year olds are minorities
  • **Projected that 2022 will be the year that minorities will become the majority**

• From the MI Dashboard (michigan.gov):
  • **31% of the Michigan population are minorities**
    (18.35% African Am, 6.42% Hispanic, 0.75% Am Indian, 2.86% Asian, 0.09% Native Hawaiian)
Demographics: Students with Disabilities

• According to the National Center for Education Statistics, 2011):
  • Youth ages 3-21 receiving special education services under IDEA rose from 4.1 million to 6.7 million between 1980 and 2005 or 10% to 14% of student enrollment. The number decreased to 13% in 2009.

• From the MI Dashboard (michigan.gov):
  • In 2012-13, 13.32% of Michigan students are students with disabilities
Demographics: Students with Limited English Proficiency

• According to the U.S. statistics:
  • Over 1 in 5 students (21%) speak a language other than English at home.
  • ELL or LEP students have more than doubled from 5% in 1993 to 11% in 2007.

• From the 2012-13, MI Dashboard (michigan.gov):
  • 04.34% of Michigan students are English Language Learners
Demographics: Students in Alternative Education Programs

- Inconsistencies in state definitions
- Significant portion are economically disadvantaged, racial and ethnic minorities and English language learners (NCES, 2013)
- Statistics were not available from the Michigan Department of Education
Demographics: Gifted and Talented Students

• Inconsistencies in definition, assessments and funding

• Nationally, approximately 6% of all students K-12 were identified as « those who demonstrate outstanding levels of aptitude or competence in one or more domains »

• Statistics are not available from the Michigan Department of Education
Demographics: Gender

• From the MI Dashboard (michigan.gov):
  • 51.6% of Michigan students are male; 48.4% are female
Science Achievement

• Achievement gaps must be closed among demographic subgroups; while promoting science achievement for all students
  • TIMMS
  • PISA
  • NAEP
4th-12th Grade National Scores

- 4th Grade
- 8th Grade
- 12th Grade

Educational Policies

• NCLB of 2001 introduced a new era of high-stakes testing and accountability policies (AYP)
• Common Core State Standards (CCSS) for ELA and Mathematics
• Next Generation Science Standards (NGSS)
Learning Opportunities and Challenges

Making Next Generation Science Standards Accessible to All Students
What does “All Standards, All Students” mean for Michigan?

- How will we make NGSS accessible for our increasingly diverse student population?
- What are the learning opportunities and challenges for:
  - Economically disadvantaged students
  - Racial or ethnic minority students
  - Students with disabilities
  - English language learners
Commonalities Among the Practices in Science, Mathematics and English Language Arts

Based on work by Tina Chuek ell.stanford.edu
Science Practices for “All Students”

Think-and-Share

**Think:** Look at the science practices (blue circle) identified in the Venn diagram and their relationship to practices in mathematics and ELA.

What learning opportunities (group 1) or challenges (group 2) do they present for your student group? *(Please record your ideas on your card.)*

**Share:** Share your ideas with your table mates.
NGSS for ALL Students

**Move-and-Share**

**Move:** Move to a group with the same type of students that you thought about (Same colored card) in the first activity.

**Share:** Opportunities to learn and challenges that you identified. Record on a big post-it by making a separate list for each.

Let’s take a closer look at NGSS.
NGSS Middle School Science
Session 1

MS. Matter and Energy in Organisms and Ecosystems
Performance Expectations

• MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.]

• MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. [Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]
Science Practices for “All Students”

Think-and-Share

Think: Look at the NGSS performance expectations identified in Session 1 for Middle School Science

What learning opportunities and challenges do they present for your student group? (Please record your ideas on your card.)

Share: Share your ideas with your table mates. Record on your big post-it.
Gallery Walk

Agree, Disagree, Question, Add

• Pair with someone in your group. Look at the poster for each student group.
  – Agree
  – Disagree
  – Questions
  – Additions – use a new color
Effective Strategies for Implementation of NGSS for All Students

*Find- Record-Reflect -Share*

**Find:** Identifies effective strategies for implementation of NGSS, additional learning opportunities and/or challenges for your student group using Appendix D

**Record:** Record these on a big Post it.

**Reflect:** Reflect on the implementation of these strategies in Michigan with your table.

**Share:** Share your reflections with the entire group.
What is the Purpose of Appendix D?

• Focus on *issues of student diversity and equity in relation to NGSS*

• Intended for *educational policies* as they highlight emerging national initiatives

• Intended for *classroom practices*

• Highlight key findings in *research literature on student diversity and equity*

• Provide the context in terms of *demographics, science achievement and educational policies*
Questions

Making Next Generation Science Standards Accessible to All Students

http://www.create4stem.msu.edu/ngss
References

