

The Forum for America's Ideas

EARLY STEM: RESEARCH, PRACTICE AND POLICY

PRESENTATION TO THE
EARLY LEARNING FELLOWS
AUGUST 27, 2018



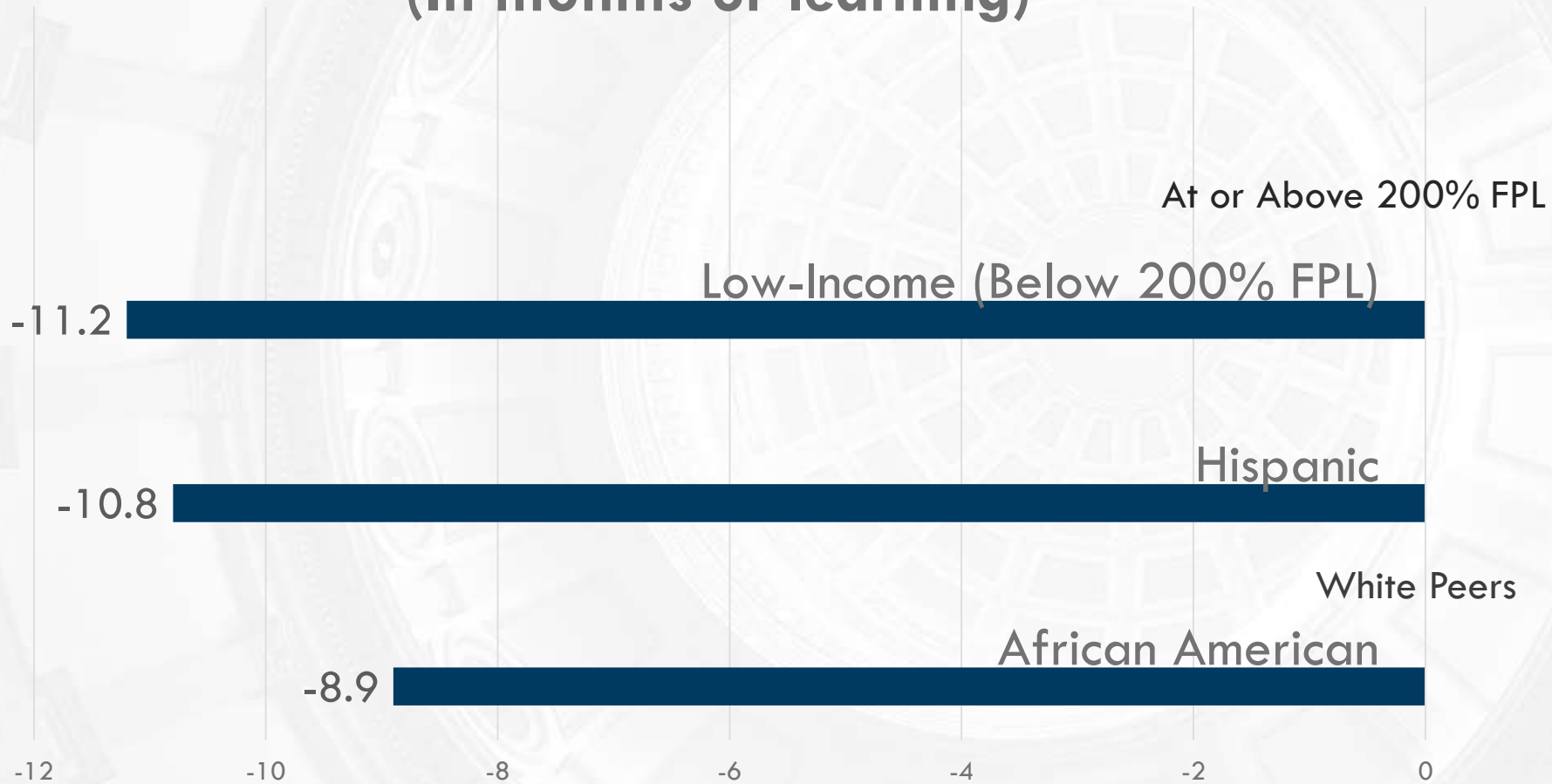
NATIONAL CONFERENCE *of* STATE LEGISLATURES

Objectives

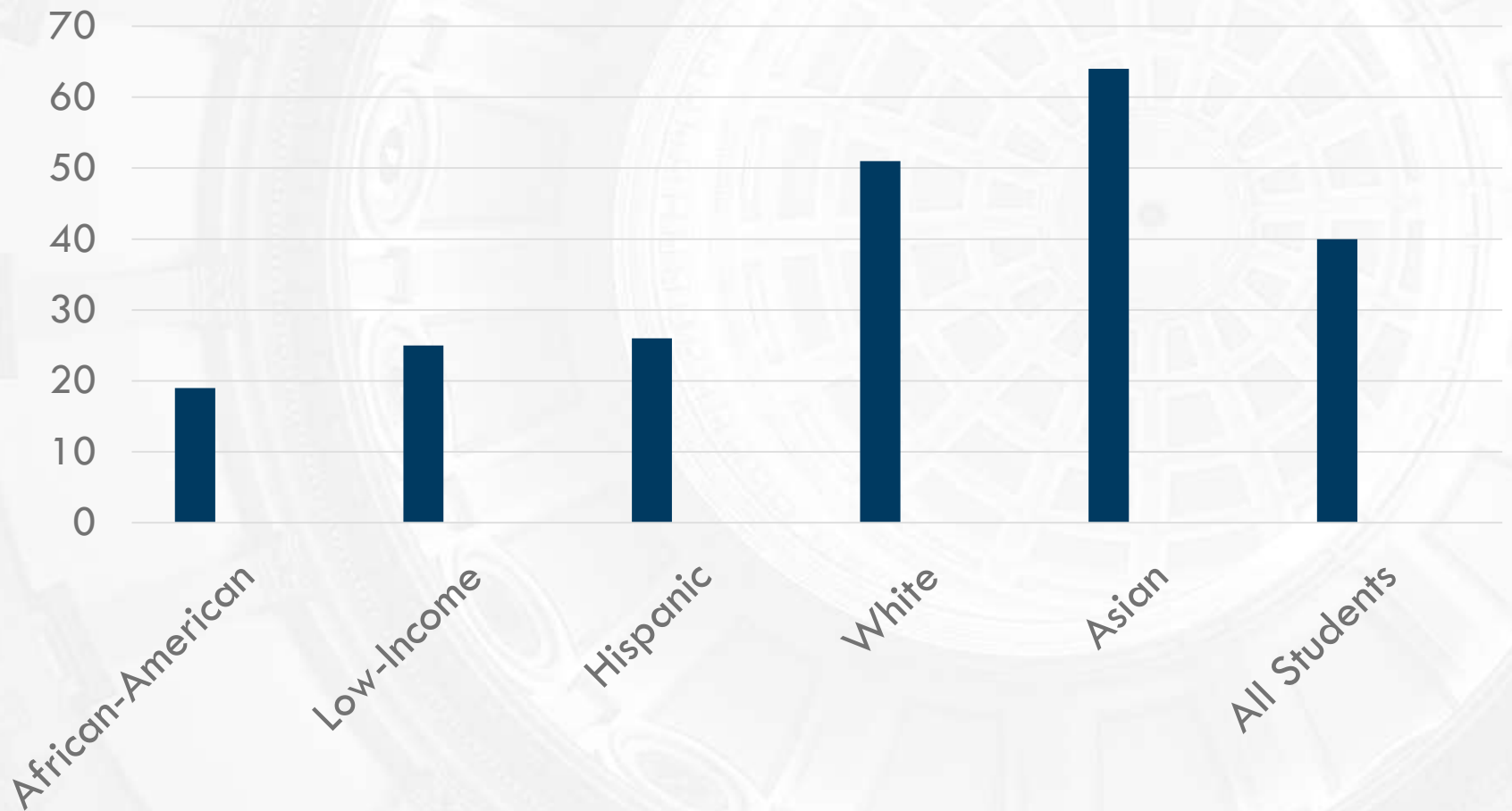
- Presentation:
 - ▣ Significance of building early STEM skills
 - ▣ Using numeracy and early math as an example, demonstrate:
 - Behavior and brain science basis for appropriateness of STEM in early childhood
 - Essential aspects of mathematics in early childhood
 - Role of parents, caregivers, teachers and community
 - ▣ Discuss policy implications and needs
 - ▣ Provide resources for further study
- Q & A
- Activity and discussion



Kindergarten Entry Numeracy Skill Gaps (In months of learning) ¹



4th Grade Math Proficiency (2017 NAEP) ²



International Comparisons

- U.S. rankings in math (out of 71 countries) ³
 - 2000: 19th
 - 2012: 38th
- 59% of high school graduates are not academically ready for college-level math classes ⁴
- U.S. rankings in science ⁵
 - 2000: 14th
 - 2016: 24th



“Math is the language of STEM”

- **“It is the foundational element that enables the development of skills in science, technology and engineering.”**
- Infants can reason, problem solve and test physical hypotheses ⁶
- Entering kindergartners have ability to think concretely and abstractly and use a range of scientific reasoning processes ⁷
- Students engaged in STEM by the time they are adolescents are more likely to pursue the field as adults ⁸



Implications

□ Economic/Workforce

- 3 million STEM jobs remain unfulfilled ⁹

- STEM sector grew by 17% from 2008-2018, compared to 9.8% for all other occupations ¹⁰

□ Military

- 71% of Americans between 17-24 are ineligible to serve in the military (education accounts for 25%) ¹¹



Potential Strategies

- Colorado House Bill 17-1201
 - ▣ Seal of STEM
 - ▣ Pathway for developing skills and motivation early on (notification officially starts in 6th grade)
- ASU offers STEM-concentration option for K-8 teachers



Presentation

- Dr. Michèle Mazzocco
 - Professor, Institute of Child Development, University of Minnesota
 - Research Director, Minnesota Center for Early Education and Development



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