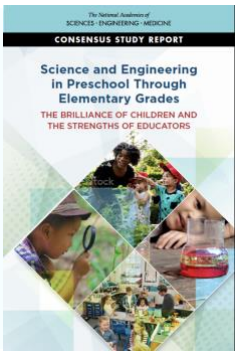
NATIONAL ACADEMIES Sciences Engineering Medicine

Board on Science Education

Science and Engineering in Preschool through Elementary Grades

The Brilliance of Children and the Strength of Educators



National Academy of Sciences, Lecture Room
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THURSDAY, SEPTEMBER 15, 2022 (All times are ET)

Purpose

To continue engagement with stakeholders around key recommendations from the *Science and Engineering in Preschool Through Elementary Grades: The Brilliance of Children and Strengths of Educators* report. Conversations will focus on what implementation of science and engineering looks like in elementary classrooms, the development of curricular materials, and considerations for policy and practice for leaders.

9:00–9:30 **Welcome and Introduction to the Report**

Heidi Schweingruber, *Director, Board on Science Education*
Betsy Davis (Committee Chair), *University of Michigan*

9:30–10:45 **Fireside Chat: Learning in Practice**

Moderator: Jenn Brown-Whale, *Howard County Public School System Resource Teacher, Elementary Science*

Panelists:

- Jennifer Atkins, Kindergarten Teacher, *Waverly Elementary School*
- Connie Haymon, Math Specialist, *Laurel Woods Elementary School*
- Linda Wilson, Grade 5, *Manor Woods Elementary School*

10:45–11:00 **Break**

11:00–12:15 **Panel Discussion: Designing Curricular Materials for Elementary Science and Engineering**

Moderator: Eve Manz (Committee Member), *Boston University*

Panelists:

- Terrance Burgess, *Michigan State University*
- Christine Cunningham, *Pennsylvania State University*
- María González-Howard, *University of Texas at Austin*
- Amelia Wenk Gotwals, *Michigan State University*
- Ted Willard, *Discovery Education*

12:15–1:30 **Lunch and Informal Discussions**

1:30–2:45 **Panel Discussion: Policy, Practice, and Leadership**

Moderator: Tiffany Neill (Committee Member), *Oklahoma State Department of Education*

Panelists:

- Kate McNeill, *Boston College* (virtual)
- Sara Mead, *Assistant Superintendent for Early Learning, DC Office of the State Superintendent of Education*
- Jennifer Williams, *NSTA Division Director for Preschool and Elementary Science Teaching, Isidore Newman School*

2:45–3:00 **Reflections from Sponsor**

Amber Oliver, *Robin Hood Learning + Technology Fund* (virtual)
Jim Short, *Carnegie Corporation of New York* (virtual)

3:00 **MEETING ADJOURNS**

Biographies

JENNIFER FADER ATKINS, MS, holds a BA in Early Childhood Education from Frostburg State University, an MS in Early Childhood Special Education from Johns Hopkins University, and National Board Certification as an Early Childhood Generalist. She has taught Kindergarten for her entire career of 25 years. Jennifer works for the Howard County Public School System in Maryland. In addition to teaching, Jennifer is the Teacher Development Liaison for her school, is active in the Elementary Science Teacher Leader Cohort, and leads professional development for peers. She enjoys spending time with her family, especially watching her sons play baseball!

JENN BROWN-WHALE, BS - a travel enthusiast and avid hiker - is in their eighth year as the Elementary Science Resource Teacher for the Howard County Public School System. This Maryland district consists of 42 Elementary schools serving approximately 24,000 K-5 students. Jenn's role is focused on three main charges: curriculum development, professional learning, and instructional coaching. They hold a B.S. in Counseling and Human Services from Stevenson University and a Master of Arts in Teaching from Towson University. Jenn served as a fourth-grade classroom teacher, as well as a sixth-grade outdoor educator prior to entering their role at the district level. Jenn was a member on the Achieve Peer Review Panel for two years and continues to participate in and lead a variety of curriculum development and evaluation projects outside their school system responsibilities.

TERRANCE BURGESS, Ph.D., is an Assistant Professor of science education in the Department of Teacher Education at Michigan State University. He holds a BA degree in Geological Sciences and a MA degree in Education from the University of North Carolina at Chapel Hill. He also holds a PhD in Teaching and Curriculum with a specialization in Science Education from Syracuse University. Broadly, his research focuses on how increasing equitable science learning opportunities for elementary youth of color influences their multiple identities within urban schools and communities. More specifically, his work utilizes qualitative methodologies to center the voices of youth of color as they engage in science learning to make sense of how they come to view themselves as scientists while contending with their other identities. Additional areas of his research explore how teachers' positionalities and their implementation of standards-driven curricula tend to youth's multiple identities. Prior to joining the faculty at Michigan State University, Terrance was a secondary science teacher in Durham, NC.

CHRISTINE CUNNINGHAM, Ph.D., aims make engineering, science, and computational thinking education more equitable, especially for populations that are underrepresented in STEM. She is a Professor of Practice in Education and Engineering at the Pennsylvania State University. Cunningham is also the founding director of Youth Engineering Solutions (YES), which develops equity-oriented, research-based, field-tested curricula and professional learning resources for preK-8 youth and their educators. Her research focuses on articulating frameworks for precollege engineering education and exploring affordances of engineering for learners. Previously, Cunningham was a vice president at the Museum of Science in Boston where she was the founding director of Engineering is Elementary (EiE), which reached 200,000 educators and 20 million children under her leadership. Cunningham currently serves as a member of the National Assessment Governing Board and the Chair of the National Academy of Engineering's Inclusive, Diverse, Equitable Engineering, for All (IDEEA) Committee. She is a fellow of the American Society for Engineering Education and has received numerous awards including the American Society of Engineering Education K-12 and Pre-College Division Lifetime Achievement Award, the IEEE Pre-University Educator Award, and the International Society for Design and Development in Education Prize. In 2017, her work was recognized with the prestigious Harold W. McGraw Jr. Prize in Education. Christine holds joint B.A. and M.A. degrees in biology from Yale University and a Ph.D. in Education from Cornell University.

MARIA GONZÁLEZ-HOWARD, Ph.D., is an Assistant Professor of STEM Education at The University of Texas at Austin. Her research explores the intersections of multilingualism, scientific sensemaking, and teacher education, with a specific focus on the ways multilingual students engage in science practices through translanguaging. She holds a B.A in Physics from Ithaca College, a Ed.M. in Teaching English to Speakers of Other Languages from Boston University, and a Ph.D. in

Science Education from Boston College. Before pursuing her graduate studies, she was a middle school science teacher in general and sheltered English instruction classrooms in both Texas and Massachusetts. She has designed and led professional developments for teachers of grades prek-12, and has presented at national and international conferences including the American Educational Research Association, The National Association of Research in Science Teaching and the National Science Teaching Association. María has also published in several researcher and practitioner journals, like *The Journal of Research in Science Teaching, Science Education,* and *Science Scope*. Currently, she is a leading a five-year National Science Foundation CAREER grant focused on preparing elementary preservice teachers to support multilingual students' engagement in science practices.

AMELIA WENK GOTWALS, Ph.D., is an associate professor in the Department of Teacher Education at Michigan State University. Her research focuses on the intersections of scientific sensemaking, formative assessment, and teacher learning. She co-leads the SOLID Start project (**S**cience, **O**ral Language, and **Li**teracy **D**evelopment from the **Start** of School), which has developed resources - including open-access integrated science and literacy curriculum materials and professional learning tools – to support early elementary teachers in engaging their students in sensemaking science talk. She has also used a learning progression framework to examine and assess the ways that students develop more sophisticated science understandings and practices. Amelia's work has been funded by the Spencer Foundation, the National Science Foundation, and the CREATE for STEM institute. She holds a B.A. in Biology from Brown University, a M.S. in Ecology and Evolutionary Biology and Ph.D. in Educational Studies with a focus on science education, both from the University of Michigan.

CONNIE HAYMON, MS, is entering her fourteenth year of teaching. She has taught second, fourth, and fifth grades and is transitioning to the role of math specialist this year. She has been involved in supporting her local district and state with science instruction and assessments over the last seven years. Connie also received a nomination for the Presidential Awards for Excellence in Mathematics and Science Teaching for science last year. She earned her bachelor degree in elementary education and her masters in middle school mathematics, both from Towson University.

KATHERINE L. MCNEILL, Ph.D., is a Professor of science education at Boston College. A former middle school science teacher, she received her doctorate in science education from the University of Michigan. Her research focuses on how to support students with diverse backgrounds in engaging in science practices as they make sense of phenomena. She has worked on projects designing and researching curriculum, assessments, professional development and other resources to support students, teachers and instructional leaders in scientific sensemaking. Dr. McNeill has published the findings from her work in over 75+ publications including books, book chapters and journal articles for both educational researchers and practitioners. Currently, she is researching the customization and scale up of high quality open-source NGSS aligned instructional materials.

SARA MEAD, BS, is Deputy Superintendent of Early Learning with the Office of the State Superintendent of Education for the District of Columbia. In this role, she leads the District's efforts to ensure that all young children and their families have access to high-quality early learning programs that support family needs and children's learning and development and that early learning programs and early educators are supported by funding, policies and systems that equip them to thrive. Prior to joining OSSE, Sara was a partner with Bellwether Education Partners, where she led Bellwether's Policy and Evaluation team and early childhood work. She has written extensively and conducted policy analysis on early childhood education, charter schools, teacher quality, and state and federal education policy issues and has provided strategic advising support to foundations, advocacy organizations, and school and early childhood program operators working to improve early learning and educational outcomes for children in diverse communities, states and nationally. Her work has been featured in media outlets including The Washington Post, The New York Times, Slate, USA Today, and U.S. News & World Report. Sara previously directed the New America Foundation's Early Education Initiative and worked for Education Sector, the Progressive Policy Institute, and the U.S. Department of Education. From September 2009-July 2017, she served on the District of Columbia Public Charter School Board, which authorizes charter schools in Washington, D.C., and since 2017, she has served on the board of the National Association of Charter School Authorizers, which she currently chairs. The daughter, granddaughter, and sister of public school educators, she lives in the District of Columbia with her husband. She holds a bachelor's degree in public policy from Vanderbilt University.

AMBER OLIVER, MS, is Managing Director of the Robin Hood Learning + Technology Fund, a collaboration between Robin Hood, Overdeck Family Foundation and Siegel Family Endowment to transform learning for low-income students with technology. Previously, Amber was the COO of GripTape, where she helped build a strategy to put 1M youth in the driver's seat of their own learning. Amber also served as the VP of Globaloria, now Proto and part of Carnegie Learning, which helped thousands of students become knowledge-producers as they learned to design and code their own educational games. Amber has also held positions at UNICEF, the United Nations Secretariat, The World Bank, the Economist Intelligence Unit, and led efforts in Bangladesh, France, India, Niger and Senegal. She holds a Master's degree in International Affairs from Columbia University and a Bachelor's degree from Brown University.

JIM SHORT, Ph.D., is the Program Director for Leadership and Teaching to Advance Learning at Carnegie Corporation of New York. His work at the foundation focuses on building the capacity of teachers and system leaders to implement new college and career-ready standards. The portfolio invests in the development of high-quality instructional materials, assessments, and curriculum-based professional learning for teachers and instructional leaders. Building on the foundation's support for new science standards, the Corporation launched OpenSciEd in 2018 partnering with ten states to improve the supply of and demand for high-quality science instructional materials and curriculum-based professional learning. In 2020, Short co-authored a Corporation report on *The Elements: Transforming Teaching through Curriculum-Based Professional Learning*. Prior to Carnegie Corporation, Short was the founding Director of the Gottesman Center for Science Teaching and Learning at the American Museum of Natural History in New York City. His experience in education also includes teaching secondary science as well as graduate courses in science education, director of the National Academy for Curriculum Leadership at BSCS Science Learning, and district science coordinator in Denver Public Schools. Jim earned a bachelor's degree in biology from Rhodes College, a Master's in science education from Peabody College for Teachers at Vanderbilt University and a doctorate in education with a focus on curriculum and instruction from Teachers College at Columbia University.

TED WILLARD, BS, is a Senior Subject Matter Expert in Science for Discovery Education where he develops three-dimensional, phenomenon-based science curricula. Before joining Discovery Education, Ted spent eight years as the in-house standards expert for the National Science Teaching Association (NSTA). In this role, he supported implementation of the *Next Generation Science Standards* (NGSS), other standards based on *A Framework for K–12 Science Education*, and three-dimensional learning. He is the author of *The NSTA Atlas of the Three Dimensions* (NSTA Press, 2020) and editor of *The NSTA Quick-Reference Guide to the NGSS* (NSTA Press, 2014). Before joining NSTA, Ted spent twelve years at Project 2061 for the American Association for the Advancement of Science (AAAS), where he was responsible for the development of the *Atlas of Science Literacy, Volume 2* (AAAS, 2007). He was also involved in many of Project 2061's efforts in standards-based education reform, including teacher professional learning, curriculum resources development, assessment development, and science education research. Earlier in his career, Ted was a high school physics teacher. He has a degree in Earth, Atmospheric, and Planetary Science from the Massachusetts Institute of Technology.

JENNIFER WILLIAMS, BS, is entering her thirtieth year of teaching science and STEM to elementary aged children. As the Lower School science chair at Isidore Newman School, she provides leadership in the development of quality instruction within the Lower School science program for grades Pre-Kindergarten through 6th grade. Jennifer holds B.S. in elementary education from Louisiana State University and continues her course work in STEM education. Jennifer serves on the executive board of the National Science Teaching Association as the Preschool – Elementary Division Director. Additionally, she oversees the Elementary STEM Showcase event for NSTA conferences and has served multiple times as chair for NSTA's STEM Forum & Expo. She is presently serving as Coastal Fellow at the Louisiana Department of Education. Throughout her teaching career, she has been fortunate to receive many accolades, including the Presidential Award for Excellence in Mathematics and Science Teaching, the PBS Innovation Award for Elementary STEM, and the National Science Teaching Association's Early Science Education Award. She was named Louisiana's Outstanding Elementary Science Teacher, and her transdisciplinary units of study earned her the Louisiana Endowment for the Humanities Teacher of the Year award.

LINDA WILSON, MS, holds a BS in Elementary and Kindergarten Education from Pennsylvania State University and a MS in Education and Teacher Leadership from Johns Hopkins University. Most of her 30+ year career has been spent teaching grades 3-5 in Maryland's Howard County Public School System (HCPSS). Linda has been an active member of the HCPSS Elementary Science Leader Cohort since its inception in 2016. She has presented and facilitated professional development for elementary teachers at school, county, state, and national levels. In 2018, she was honored by the state of Maryland when she was named a finalist for the Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST).