



MADE IN MICHIGAN

Science Education Professional Learning Resources brought to you by the MMSCN (Michigan Mathematics & Science Centers Network)

The MI Science PL@N professional learning series is guided by the National Research Council's [Guide to Implementing the Next Generation Science Standards](#) (NAP, 2015) in which recommendations for standards adoption specifically identify the need to create opportunities for collaboration. "District and school leaders should create and systematically support opportunities for teachers and administrators to collaborate within and across districts and schools, with support from relevant experts, with a focus on how to improve instruction to support students' learning as described in [A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas](#) and the [Next Generation Science Standards](#)." (NAP, 2015 - Recommendation 15)

Benefits of these Resources:

- Available for FREE!
- Resources are aligned to the new Michigan Science Standards which are based on the Next Generation Science Standards.
- Includes facilitator planner, copyright-free and/or approved resources, teacher handouts, and what is needed to ready the module for implementation.
- Each Pathway is a separate module for implementation.
- Although there is a recommended sequence for implementation, it can be done in any order.
- We hope to have all of the MI Science PL@N resources available on the MMSCN website by the first of the year (www.mimathandscience.org).

Teacher Professional Learning Pathway:

1. T-1. Digging Deep - Understanding the 3-Dimensional Vision of the Framework



- Key Takeaways: The purpose of this workshop is to develop an understanding of the vision of [A Framework for K-12 Science Education: Practices, Crosscutting Concepts and Core Ideas](#). Participants will develop a personal professional learning goal that will move toward realizing this vision.
- Available for implementation: September 2015
- Time required: 1-2 days (6-10 hours)
- Pathway Creator(s): Sarah Coleman scoleman@muskegonisd.org, Laura Chambless chambless.laura@sccresa.org

2. T-2. Exploring Phenomena Through Scientific Investigations



- Key Takeaways: In this module teachers will build understanding around the crucial role of conducting investigations within a 3-dimensional instructional framework to build student conceptual understanding. The practice of emphasis will be on Planning and Carrying Out Investigations with a lesser, but connected emphasis on Practices 1 and 2 (Asking questions and developing and using models).
- Available for implementation: January 2016
- Time required: 2 days (12 hours)
- Pathway Creator(s): Mary Lindow mlindow@bcamsc.org, Darcy McMahon dmcmahon@baystem.net, Amy Oliver aoliver@alleganaesa.org,



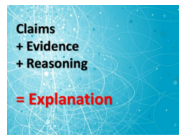
November 2015

3. *T-3 Interpreting Patterns and Relationships Through Data Analysis*



- Key Takeaways: Teachers develop an understanding of NGSS Science and Engineering Practices 4 and 5, which deal with the analysis of data and computational thinking. These practices are strongly linked to the NGSS Crosscutting Concepts 1, 2 and 3, which focus on patterns, cause and effect, and scale, proportion and quantity. Participants will consider a wide variety of ways that data can be generated or gathered by students and a set of processes called the Evidence Processing Cycle (EPC). The EPC involves 7 stages that include data processing, analysis and interpretation.
- Time required: 2 days (12 hours)
- Available for implementation: February 2016
- Pathway Creator: Mike Gallagher mike.gallagher@oakland.k12.mi.us

4. *T-4 Making Connections Through Argumentation and Explanation*



- Key Takeaways: Teachers develop an understanding of NGSS Science and Engineering Practices 6 and 7, which deal with the argumentation and explanation. Special attention will be paid to the Claim, Evidence, and Reasoning Framework to support students in constructing and evaluating explanations.
- Time required: 2 days (12 hours)
- Available for implementation: February 2016
- Pathway Creator(s): Laura Chambless chambless.laura@sccresa.org, Sarah Coleman scoleman@muskegonisd.org

Administrator Professional Learning Pathway

1. *A-1. Shifts in Instruction to Engage in the 3-Dimensional Vision of the Framework*

- Key takeaways: Administrators will establish and clearly communicate a vision of science instruction that is consistent with that of [A Framework for K-12 Science Education](#) and the [Next Generation Science Standards](#) and ensure that their actions, policies, and resource allocations for science education, are aligned to supporting that vision.
- Time Required: 5 hours
- Available for implementation: November 2015
- Pathway Creator: James Emmerling, jemmerling@geneseeisd.org

NGSX - Next Generation Science Exemplar

Argumentation, Explanation, and Modeling of the Behavior of Matter

- Key takeaways: Grow in your understanding of 3-dimensional learning, and in particular, how scientific and engineering practices identified in [A Framework for K-12 Science Education](#) and [Next Generation Science Standards](#) play a critical role in helping students build and revise their scientific ideas over time. You will learn about and develop models, and engage in evidence-based argumentation and explanation, and explore classroom video cases, all designed to help you help your students build their understanding and explanations of natural phenomena. You'll also learn about building a classroom culture of reasoning and arguing from evidence where students go public with their ideas and build on the ideas of their classmates. As you participate in this pathway you will find that learning



MI Science PL@N: Professional Learning @ the Network PROFESSIONAL LEARNING RESOURCES

November 2015

about scientific practices goes hand in hand with your study of a core physical science concept, the structures and properties of matter. Intentionally bringing together disciplinary core ideas and crosscutting concepts with scientific practices.

- Time Required: 30 hours
- Available for implementation: November 2015
- Contact your local Mathematics and Science Center Director

Argumentation, Explanation, and Modeling of the Behavior of Matter

- Key takeaways: How to use the experience of three-dimensional learning to design lessons and units to implement with your own students.
- Time Required: 15 hours
- Available for implementation: February 2016
- Contact your local Mathematics and Science Center Director

For more information about the Michigan Mathematics and Science Centers Network (MMSCN) please contact Executive Director Mary Starr at mary@starrscience.com. The MMSCN website is www.mimathandscience.org.

These materials were developed under a grant awarded to the Michigan Mathematics and Science Centers Network by the Michigan Department of Education.