Shifts to the New Michigan Science Standards for Administrators through the lenses of Phenomenal Science and 3DSPA

MSTA

March 2, 2018
Today’s Goals

Supporting a Vision of Instruction Consistent with
A Framework for K-12 Science Education

Administrators who demonstrate understanding can:

• Communicate and support a vision of instruction that is consistent with the Michigan Science Standards
• Support teachers in making incremental and continuing changes to improve instruction consistent with the new vision for science learning
Why Make the Shift?
### State of Michigan Science Education

#### According to 2013-14 Science MEAP & MME Results

<table>
<thead>
<tr>
<th>Number of Students</th>
<th>State of Michigan Elementary School</th>
<th>State of Michigan Middle School</th>
<th>State of Michigan High School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Took the MEAP/MME</td>
<td>109,248</td>
<td>114,915</td>
<td>104,998</td>
</tr>
<tr>
<td>Proficient (passed)</td>
<td>6,503 (6%)</td>
<td>22,753 (20%)</td>
<td>29,399 (28%)</td>
</tr>
<tr>
<td>Not Proficient (failed)</td>
<td>102,745 (94%)</td>
<td>92,162 (80%)</td>
<td>75,599 (72%)</td>
</tr>
</tbody>
</table>
A typical Michigan Science Classroom
According to 2013-14 Science MEAP & MME Results
*Accountability is based on student participation in pilot/field test in 2018 and 2019. Operational science assessment of GLCEs and HSCEs will NO LONGER be conducted.
Michigan Science Standards
Think-Pair-Share

Which of the following statements do you agree with?

- Presenting clear descriptions of scientific ideas is enough for students to learn science.
- Completing applicable hands-on activities is enough for students to learn science.
Next Generation Science Standards

MS-LS2-3  Ecosystems: Interactions, Energy, and Dynamics

Students who demonstrate understanding can:

**MS-LS2-3.** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. [Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.] [Assessment Boundary: Assessment does not include the use of chemical reactions to describe the processes.]

The performance expectation above was developed using the following elements from the NRC document A Framework for K–12 Science Education:

- **Developing and Using Models**
  - Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
  - Develop a model to describe phenomena.

- **LS2.B: Cycle of Matter and Energy Transfer in Ecosystems**
  - Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem.

- **Energy and Matter**
  - The transfer of energy can be tracked as energy flows through a natural system.

**Connections to Nature of Science**

- Scientific Knowledge Assumes an Order and Consistency in Natural Systems
  - Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation.

**Connections to other DCIs in this grade-band:**

- MS.PS1.B
- Articulation of DCIs across grade-bands:
- Common Core State Standards Connections:
  - ELA/Literacy -
  - SL.8.5
  - Mathematics -
  - 6.EE.C.9

Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-LS2-3)

Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (MS-LS2-3)
### Standards Comparison: Structure and Properties of Matter

<table>
<thead>
<tr>
<th>Former State Middle School Science Standard</th>
<th>NGSS Middle School Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Distinguish between atoms and molecules.</td>
<td>a. Construct and use models to explain that atoms combine to form new substances of varying complexity in terms of the number of atoms and repeating subunits.</td>
</tr>
<tr>
<td>b. Describe the difference between pure substances (elements and compounds) and mixtures.</td>
<td>b. Plan investigations to generate evidence supporting the claim that one pure substance can be distinguished from another based on characteristic properties.</td>
</tr>
<tr>
<td>c. Describe the movement of particles in solids, liquids, gases, and plasmas states.</td>
<td>c. Use a simulation or mechanical model to determine the effect on the temperature and motion of atoms and molecules of different substances when thermal energy is added to or removed from the substance.</td>
</tr>
<tr>
<td>d. Distinguish between physical and chemical properties of matter as physical (i.e., density, melting point, boiling point) or chemical (i.e., reactivity, combustibility).</td>
<td>d. Construct an argument that explains the effect of adding or removing thermal energy to a pure substance in different phases and during a phase change in terms of atomic and molecular motion.</td>
</tr>
</tbody>
</table>
What did you notice?

- Let’s hear some of your noticings.
Revisit: Think-Pair-Share

Did you agree with the following statements?

- Presenting clear descriptions of scientific ideas is enough for students to learn science.
- Completing applicable hands-on activities is enough for students to learn science.
Scientific Ideas Are Not Enough!

- Understanding content is linked to engaging in practices.

- Simply “consuming” information leads to isolated ideas.

- Understanding both the ideas (DCIs) and processes (SEPs & CCCs) is essential for progress in science.

- Students cannot learn ideas and processes without the three-dimensional relationship established by the MSS.
Science and Engineering Practices

(Students should be...)  

- Asking questions (for science) and defining problems (for engineering)
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations (for science) and designing solutions (for engineering)
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

*See Tab Appendix F: Science and Engineering Practices*
Crosscutting Concepts
Concept that cut across and are important to all science disciplines
(Students should think about…)

1. Patterns
2. Cause and Effect
3. Scale, Proportion, and Quantity
4. Systems and System Models
5. Energy and Matter
6. Structure and Function
7. Stability and Change

*See Appendix G: Crosscutting Concepts*
Disciplinary Core Ideas
(Students will know...)

<table>
<thead>
<tr>
<th>Disciplinary Core Ideas in Physical Science</th>
<th>Disciplinary Core Ideas in Life Science</th>
<th>Disciplinary Core Ideas in Earth and Space Science</th>
<th>Disciplinary Core Ideas in Engineering, Technology, and the Application of Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS1: Matter and Its Interactions</td>
<td>LS1: From Molecules to Organisms:</td>
<td>ESS1: Earth’s Place in the Universe</td>
<td>ETS1: Engineering Design</td>
</tr>
<tr>
<td>PS2: Motion and Stability: Forces and</td>
<td>LS1.C: Organization for Matter and</td>
<td>ESS2: Earth’s Systems</td>
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</tr>
<tr>
<td>Interactions</td>
<td>Energy Flow in Organisms</td>
<td>ESS2.A: Earth Materials and Systems</td>
<td></td>
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<tr>
<td>PS2.B: Types of Interactions</td>
<td></td>
<td>Interactions</td>
<td></td>
</tr>
<tr>
<td>PS2.C: Stability and Instability in Physical Systems</td>
<td></td>
<td>ESS2.C: The Roles of Water in Earth’s Surface Processes</td>
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<tr>
<td>PS3.A: Definitions of Energy</td>
<td>and Dynamics</td>
<td>ESS2.E: Biogeology</td>
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<tr>
<td>Transfer</td>
<td>Ecosystems</td>
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<tr>
<td>Forces</td>
<td>Transfer in Ecosystems</td>
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<tr>
<td>PS3.D: Energy in Chemical Processes and</td>
<td>LS2.C: Ecosystem Dynamics, Functioning,</td>
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<tr>
<td>Everyday Life</td>
<td>and Resilience</td>
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<tr>
<td>PS4: Waves and Their Applications in</td>
<td>LS2.D: Social Interactions and Group</td>
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<tr>
<td>Technologies for Information Transfer</td>
<td>Behavior</td>
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<tr>
<td>PS4.A: Wave Properties</td>
<td>LS3: Heredity: Inheritance and</td>
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<tr>
<td>PS4.B: Electromagnetic Radiation</td>
<td>Variation of Traits</td>
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<tr>
<td>Instrumentation</td>
<td>LS3.B: Variation of Traits</td>
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<tr>
<td>LS4: Biological Evolution: Unity and</td>
<td>LS4.A: Evidence of Common Ancestry and</td>
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<td>Diversity</td>
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<tr>
<td>Diversity</td>
<td>LS4.C: Adaptation</td>
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<td>LS4.D: Biodiversity and Humans</td>
<td>LS4.D: Biodiversity and Humans</td>
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<tr>
<td>ESS3: Earth and Human Activity</td>
<td>LS3.A: Inheritance of Traits</td>
<td></td>
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<tr>
<td>ESS3.A: Natural Resources</td>
<td>LS3.B: Variation of Traits</td>
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<tr>
<td>ESS3.D: Global Climate Change</td>
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<tr>
<td>ETS2: Links Among Engineering, Technology,</td>
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<tr>
<td>Science, and Society</td>
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<tr>
<td>ETS2.A: Interdependence of Science,</td>
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<tr>
<td>Engineering, and Technology</td>
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<tr>
<td>ETS2.B: Influence of Engineering, Technology</td>
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<td>and Science on Society and the Natural</td>
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<td>World</td>
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</tbody>
</table>
Disciplinary Core Ideas
- Life Science
- Physical Science
- Earth Systems Science
- Engineering

Disciplinary Core Ideas (DCIs)
- DCIs without CCCs and SEPs
  Is a collection of scientific content without an understanding of how science is done or connected to or framed within unifying themes

Cross Cutting Concepts (CCCs)
- CCCs without SEPs and DCIs
  The CCCs alone are unifying themes that lack disciplinary content or an understanding of how science is conducted

Scientific and Engineering Practices
Process
- Asking questions/Defining problems
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematical and computational thinking
- Constructing explanations/Designing solutions
- Engaging in arguments from evidence
- Obtaining, evaluating and communicating information

NGSS Performance Expectations (PEs)
- Engagement in practices within science content, but without connection to unifying themes
- Scientific practices connected to CCCs but not to discipline-based content

Scientific and Engineering Practices (SEPs)
- SEPs without CCCs and DCIs
  Is the scientific process without connections to specific content or connections to unifying themes

References:
How we support the Shift: Curriculum

PHENOMENAL SCIENCE
Supporting the Shift

Phenomenal Science is:

• A complete K-5 Science Curriculum to meet the NGSS / MSS
• Developed by teachers and educators for teachers
• 21 Units each centered on anchoring PHENOMENA
Included in Phenomenal Science

Included in the Units:
- Goals, Evidence of Learning, Learning Plan
- Resources, Handouts
- Assessments

Included in the Process / Project:
- Professional Development
- Online Professional Development
- Unit Revision Sessions
- Facilitator Training Sessions
<table>
<thead>
<tr>
<th>Grade</th>
<th>Section 1: Topic</th>
<th>Section 2: Topic</th>
<th>Section 3: Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Grade</td>
<td>1.1: Star Light, Star Bright Space Systems</td>
<td>1.2: Feature Factor Structure, Function &amp; Info Processing</td>
<td>1.3: Oh, Say Can You See? Sound and Light Waves</td>
</tr>
<tr>
<td>3rd Grade</td>
<td>3.1: Wild Wacky Weather Weather &amp; Climate</td>
<td>3.2: Let’s Move It Force &amp; Motion</td>
<td>3.3: No Place Like Home Plants and Animals</td>
</tr>
<tr>
<td>4th Grade</td>
<td>4.1: Let it Rip! Energy</td>
<td>4.2: Built for Survival Plants &amp; Animals</td>
<td>4.3: Surf’s Up Waves &amp; Info Transfer</td>
</tr>
<tr>
<td>5th Grade</td>
<td>5.1: Go with the Flow Earth Systems</td>
<td>5.2: Ch-ch-ch-Changes Matter &amp; Its Interactions</td>
<td>5.3: To Infinity and Beyond Earth &amp; the Universe</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5.4: Round and Round It Goes Matter, Energy, Ecosystems</td>
</tr>
</tbody>
</table>
Visit Our Website

Phenomsclence.weebly.com
Professional Learning Process

Professional Learning is Critical.

We recommend:

• A minimum of one day of instructional strategies professional learning

And

• A minimum of one day prior to each unit to unpack it and plan for instruction
Facilitator’s Training

• Science Curriculum Consultants from around the state can be trained to conduct face to face professional learning for Phenomenal Science.
Introduction to Phenomenal Science

Using "Notebooking" in our Online Course

Notebooking is a Key Instructional Practice of Phenomenal Science and something you will ask your students to do as they learn science. To model this behavior, we strongly encourage you to keep your own Phenomenal Science learning notebook (a simple spiral bound notebook will suffice). Keeping a notebook as you work through this course will allow you to:

1. Build your own craftsmanship in science
2. Better understand how to best apply notebooks in your own classroom (tips, tricks, strategies)
3. Fully understand how notebooking builds understanding

During our time together, we will ask you to reflect in three ways: individually, in a group, and through an extended response. The three reflection types are highlighted in detail below.

Individual Reflection Questions

Individual reflection questions will look like this. They will provide you time to reflect on your own personal feelings and experiences around a topic. They are meant solely for you, and they’re designed to help you process how the content in the module applies to you personally. Your answers to these reflection questions should be recorded in your paper-based learning notebook.

Group Reflection Questions

Group reflection questions will look like this. They will link you to a discussion forum, where you will utilize the space to share ideas and learn from other participants in the course. They are meant to help you share your thoughts with other educators and see various perspectives on a topic.

Extended Reflection Questions

Extended reflection questions will look like this. They are similar to individual reflection questions in that they allow you to reflect on your own personal feelings and experiences around a topic. The difference is that these questions are more in-depth and require an extended response. Your answers to these questions will be recorded through an online submission form.
Web Presence

ALL 21 UNITS ON MVU WEBSITE
And can also be accessed through Phenomenal Science Website
How we support the Shift: Assessment
Practices are Two Sided Coins

Each of the eight science and engineering practices has dimensions and progressions that can only be fully expressed both within and outside of a social context.
Three Dimensions Work Together

NGSS calls for students to become proficient in science and engineering:

• Demands integration of 3 dimensions – not separate treatment of “scientific ideas” and “inquiry”

• Need to pay attention to how we build understanding over time and across the disciplines

• Need to involve learners in using science practices to develop and apply scientific & engineering ideas
Can we assess these PE’s solely through traditional style assessment?

- 2-LS2-1 Plan and conduct an investigation to determine if plants need sunlight and water to grow.
- MS-LS1-7 Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.
- HS-PS3-3 Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.
Science Assessment System Goals

- Science assessments in Michigan must be a coherent system of assessment to support both classroom learning and policy/monitoring functions.

- Michigan monitoring (accountability) science assessments must move beyond traditional forms; testing as usual will NOT suffice.

- Opportunity to learn science is an essential system component.

- Classroom science teaching and assessment come first.

NRC, 2014

“Changing large-scale accountability tests may be the most challenging piece of the puzzle, but teachers can proceed even while system-wide changes are evolving” (p.22, NASEM, 2017).
2018 – 2019 Pilot & Field Test

2018 – Pilot Test
- 2 Forms per grade (5, 8, 11)
- Partial Test Map
- 3 Item Clusters per form
  - 1-Physical Science
  - 1- Earth Science
  - 1- Life Science

2019 – Field Test
- 2 Forms per grade (5, 8, 11)
- Full Test Map
- 6 Item Clusters per form
  - 2-Physical Science
  - 2- Earth Science
  - 2- Life Science

Develop and include student supports:
Paper-pencil form, Text-to-Speech, Accommodated form, Braille form, Translations

The pilot and field tests will provide important information regarding actual testing times so OEAA can make the necessary adjustments.
Vision for Balanced Assessment System for Michigan Science Standards

Unit based – Performance Tasks, Portfolio, Problem solving

Item Clusters & Performance Tasks

Classroom Formative Assessment
- Performance Task
- Module Assessment
- Module Assessment

Classroom Summative Assessment
- Performance Task
- Module Assessment
- Module Assessment

Module Assessment
- Interim Assessment
- Interim Assessment

M-STEP Assessment

3DSPA

MDE

Gap

Flow of Data

Curriculum
M-STEP will consist of Item Clusters

- Item clusters are also built on Bundles and Phenomena, but use Stimuli instead of Scenarios
- Item clusters are more paper-pencil sorts of assessments and can be individually accomplished
- Each item in a cluster is aligned to at least 2 of the 3 dimensions, thus allowing each cluster to measure understanding of all 3 dimensions as a whole
- Item clusters can be paired with 3DSPA Performance Tasks to get a more complete understanding of student learning
Release Annotated Item Clusters – Fall 2017
Lights Out! (Part 1)

Students are learning about eyes in science class. During their class discussion, a power outage occurs and the lights go out in the classroom. While the teacher looks for a flashlight, one student exclaims, “I can’t see anything!”

The teacher turns on a flashlight and points it across the classroom to a plant on a table. The teacher says, “This makes me wonder how we are able to see the plant.”

Which statement best describes how the students are able to see the plant?

a. Once the plant produces its own light, the students can observe the plant.

b. Once the plant absorbs all the light from the flashlight, the students can observe the plant.

c. The light from the flashlight is reflected toward the students’ eyes and then back to the plant.

d. The light from the flashlight is reflected off of the plant and then enters the students’ eyes.
Annotated Sample M-STEP Item Clusters

Annotated M-STEP Item Sets Link

2018 Science Grades 5, 8, and 11 Annotated Sample Items
http://3dsciassessment.weebly.com
Administrative Takeaways
How will science education change with the MSS?

Science education will involve **less:**

1. Learning of ideas disconnected from questions about phenomena
2. Teachers providing information to the whole class
3. Teachers posing questions with only one right answer
4. Students reading textbooks and answering questions at the end of each chapter
5. Worksheets
6. Oversimplification of activities for students who are perceived to be “less able” to do science and engineering

Science education will involve **more:**

1. Systems thinking and modeling to explain phenomena and to give a context for the ideas to be learned
2. Students conducting investigations, solving problems, and engaging in discussions with teacher guidance
3. Students discussing open-ended questions that focus on the strength of the evidence used to generate claims
4. Students reading multiple sources and developing summaries of information
5. Student writing of journals, reports, posters, and media presentations that offer explanations and arguments
6. Provision of supports so that all students can engage in sophisticated science and engineering practices
Supporting Implementation of MSS

What are key questions that principals should consider during implementation?

- What kind of professional learning is available and how do I ensure my teachers and I have access to it? How do I know it’s high quality?
- What MSS-aligned instructional materials do my teachers and students need and how do I make sure they get them? How do I know if the materials are high quality?
- What formative assessments are available to help teachers continually evaluate their students’ learning?
- How can we connect the MSS with work we are doing to improve teaching and learning in English language arts and math?
Supporting Implementation of MSS

What can principals do to support implementation?

- Focus on what the students are doing first and then think about what the teacher has designed to make that happen;
- Know the standards enough to identify and provide feedback on aspects of the three dimensions during classroom visits;
- Engage teachers on how the three dimensions are incorporated into lessons.
Expecting Instruction to Change Overnight

Shifting instruction to incorporate all of the scientific and engineering practices and designing tasks for students that integrate the three dimensions (practices, crosscutting concepts, and core ideas) will take time. Teachers first need to understand the changes expected and the reasons for them and then move in steps to incorporate these changes into their instruction. Not everything can be changed at once, nor will the first steps necessarily engender the sense of success that would foster commitment to the change. It is likely that 2–3 years of professional development for teachers will be needed to help them make the changes to instruction that are called for in the NGSS. Teachers will then need ongoing support to continue to refine their instructional practices. One approach for this kind of support might be participation in a teacher learning community devoted to this goal.
Pitfalls to Avoid

Asking “Which Standard Are You Teaching Today”?

A “standard by standard” approach to curriculum does not work for the NGSS. The NGSS are student performance outcomes for the end of a grade level or grade band; they are not a list of activities for the classroom. Covering standards one at a time would lead to redundancies and fragmented learning. The particular combinations of the three dimensions represented in the NGSS are not prescriptive of how they should be combined in instruction. Facility with any one practice requires using others, and all of them need to be experienced in the context of learning multiple different core ideas. That is the way that students can gain facility in using them in any particular context in a testing situation. Moreover, in order to provide time for students to undertake investigations and engage in discourse, there is insufficient time to address each standard separately. Instead, standards will need to be bundled into instructional units that recognize the interconnections between the science and engineering practices, subideas within and across disciplinary core ideas, and the role of the crosscutting concepts in elucidating these connections (Krajcik et al., 2014; Pruitt, 2014).
Pitfalls to Avoid

Failing to Communicate with Parents and the Community

Failure to communicate to parents and the community and to enlist their understanding and support of implementation of the NGSS can lead to resistance to the new standards or unrealistic expectations of how fast it will occur. To be able to sustain change over time, it is essential that districts reach out early on to help the community engage with and embrace the vision for change and the inevitable process of continuous improvement or they will be caught being reactive when something does not initially go as smoothly as expected.

Messages should be developed to specifically reach parents, and events should be planned to engage them in dialogue about the change process. If parents and community leaders are engaged at the planning stage and are informed about the reasons for the changes and the expected timelines to implement them, they are more likely to be supportive.
### Master Teacher Evaluation Comparison for Science

<table>
<thead>
<tr>
<th>Science Instruction</th>
<th>5D+</th>
<th>Danielson</th>
<th>Marzano</th>
<th>Thoughtful Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Targets:</td>
<td>Purpose P1, P2, P3, P4, P5</td>
<td>Domain 1c: Outcomes</td>
<td>Domain 1: Routines</td>
<td>Dimension 5: Preparing Students for New Learning</td>
</tr>
<tr>
<td>- Address 3D: Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts</td>
<td></td>
<td>Domain 1f: Designing Student Assessments</td>
<td>DQ #1: Communicating Learning Goals and Feedback</td>
<td>5.1, 5.2, 5.3, 5.6, 5.8</td>
</tr>
<tr>
<td>- Acknowledges students are figuring something out instead of learning about something in natural world</td>
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<td>Domain 3a: Communicating with Students</td>
<td>Concerns/Wonderings: Target too content driven</td>
<td>Dimension 7: Deepening and Reinforcing Learning</td>
</tr>
<tr>
<td>- Based on performance assessments (both FA and SA)</td>
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<td>Domain 3d: Using Assessment in Learning</td>
<td>Target not including a question Rubric for</td>
<td>7.1</td>
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<td>students to gage target gives too much away</td>
<td>Dimensions 8: Applying Learning</td>
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<td>when students are “figuring something out”</td>
<td>8.1</td>
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<td>Domain 2: Planning and Preparing</td>
<td>Dimension 9: Reflecting and Celebrating Learning</td>
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<td>DQ 42, 43, 44, 45, 46</td>
<td>9.1</td>
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</table>

Please note that 3 Dimensional Learning will require a classroom management component not all teachers are familiar carrying out in their classrooms and help will be needed to learn how to do this effectively.
How do you get involved?
Professional Learning
PERFORMANCE TASK REVISION TEAM

Three-Dimensional Science Performance Assessments (3DSPA) Seeks Revision Team Members

This is a terrific opportunity for 3rd-12th grade science teachers to be part of the development of great 3-D science resources for use by teachers and students.

During this three-day session, revision team members will

- Develop understanding of the feedback on one of the Three-Dimensional Science Performance Assessment Tasks.
- Using that feedback, revise one of the tasks with facilitated guidance, coaching, and collegial support.

The tasks, once finalized, will be shared and made available for all teachers.

EVENT DETAILS
June 26-28, 2018
8:30 am to 3:30 pm
CMU
Stipends Available
Lunch Provided

Find out more
(989) 615-4372  mcmah1ds@cmich.edu
PHENOMENAL SCIENCE

Level Two

Offered by the Central Michigan Science, Mathematics, Technology Center

Have you completed PS Unit Introduction or Curriculum Rollout? Started implementing Phenomenal Science units? Looking for a way to continue to build your craftsmanship and work toward three-dimensional science instruction? Then this is the professional learning for you!

In these sessions participants will:
- Share problems of practice and implementation tips
- Learn and grow from student work
- Dig deeply into planning the key instructional strategies of Phenomenal Science
- Build a supportive Phenomenal Science community

CLICK HERE TO REGISTER

2018-19 SERIES DETAILS
August 16-17 & two school-year days TBD
8:30 am to 3:30 pm
CMU
Cost: $200
Lunch Provided

Find out more
(989) 615-4372
mcmah1ds@cmich.edu
PHENOMENAL SCIENCE

Coaches Training Sessions

Offered by the Central Michigan Science Mathematics Technology Center

These professional learning sessions are geared for teacher-leaders or district coaches. Coaches should have either attended a Unit Introduction or Curriculum Rollout series or will take this along side their teacher participants.

- Participants of the Coaches Training Sessions will be prepared to guide teachers through their planning and implementation of the Phenomenal Science Units.
- Participants will understand how to access and implement many supporting resources to assist teachers and lead PLC / implementation groups.

EVENT DETAILS
August 6-8, 2018
8:30 am to 3:30 pm
plus school-year virtual meetings
CMU
Cost: $200
Lunch Provided

CLICK HERE TO APPLY
Find out more
(989) 615-4372 | mcmah1ds@cmich.edu
PHENOMENAL SCIENCE

Facilitator’s Training Sessions

Offered by the Central Michigan Science, Mathematics, Technology Center

These sessions are geared for Science Consultants or District Science Leaders

Participants leave equipped with the knowledge and resources to implement and facilitate the complete five-day Phenomenal Science Unit Introduction in their district or region.

⇒ During these sessions, participants will learn

- How to properly implement Phenomenal Science professional learning to enable teachers to enact Phenomenal Science Units
- How the Phenomenal Science Key Instructional Strategies align to meet the shift in the Michigan Science Standards

Facilitator’s Cohort 4 DETAILS

July 10-12, 2018
8:30 am to 3:30 pm
plus school-year virtual meetings

CMU
Cost: $200

CLICK HERE TO APPLY

Find out more
(989) 615-4372 | mcmah1ds@cmich.edu
PHENOMENAL SCIENCE

Introduction to Units for K-5 Teachers

Offered by the Central Michigan Science Mathematics Technology Center

⇒ This five day professional development series is designed for K-5 teachers intending to implement these units in their classroom during the upcoming year.
⇒ Teachers will develop deeper understanding of
  • Michigan Science Standards
  • Phenomenal Science Core Principles
  • Phenomenal Science Key Instructional Strategies
⇒ And be prepared to enact the Phenomenal Science Units

CLICK HERE TO REGISTER

2018-19 SERIES DETAILS
August 13-15 & two school-year days TBD
8:30 am to 3:30 pm
CMU
Cost: $250
Lunch Provided

In partnership with Phenomenal Science Units were developed by
Michigan Virtual University CMU
In collaboration
Michigan Math & Science Centers Central Michigan SMTC
Science Mathematics Technology Center
Oakland Schools

Find out more (989) 615-4372
mcmah1ds@cmich.edu

These materials were developed under a grant awarded by the Michigan Department of
Introduction to Phenomenal Science

Price: Free
Credit Hours: 3
Description: Strategies and principles behind the Michigan Science Standards and the K-5 Phenomenal Science curriculum.
Keyword: Science
Credit Type: SCECH
Q&A
THANK YOU

- Feel free to contact us with any questions, concerns, or to connect with science opportunities and resources:

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