

1423 | Using Improvement Science to Improve Science

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COLLEGE OF
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Handout 1: PDSA Cycle: Improving Science- Cycle #1 - October 2018

[1-2 lessons + 1 PLC = Cycle 1]

Overall Aims	By December 2019, improve all participating teachers' knowledge of NGSS implementation and ability to identify NGSS-aligned instructional resources within their school system.
Focus Driver(s) for Testing	<p>HQ Professional Learning: <i>Engage teachers and administrators in high-quality professional learning that addresses the quality and use of curriculum and instructional materials</i></p> <ol style="list-style-type: none"> Professional learning time, structures and processes for teachers and teacher leaders School-level capacity and resources to support professional learning
Change Idea being Tested	To improve teacher knowledge and capacity by using a common self assessment process for teachers to examine and reflect on their implementation of NGSS-aligned lessons, and to share observations with colleagues in structured professional learning team meetings.
Team Members	Teachers in participating schools will do the testing and members of the WMN coalition will observe and document the process

1. Plan – Plan Your Test and Predict What Will Happen

1a. Test Steps

During the second week of October all science teachers in all four participating schools will conduct the following test

- Teachers will select a lesson(s) and curriculum materials that are NGSS aligned (or that they think are aligned) to deliver it in one or more classes;
- Teachers will complete a brief pre-lesson portion of the assessment and reflection tool
- Following the implementation of the lesson, teachers will complete a brief post-lesson portion of the assessment and reflection tool
- Teacher will participate in an organized 30 minute discussion at a PLC meeting using the PLC meeting protocol
- WMN coalition members will observe the meeting and document proceedings.

1b. Learning Goals	1c. Measures	1d. Predictions
<p><i>What do you hope to learn from this test?</i></p> <ul style="list-style-type: none"> ● What was the assessment by teachers of the adequacy of the (current) instructional resources to deliver NGSS lesson? ● What opportunities assisted teachers in delivering a NGSS lesson, and what barriers hindered them? ● Did teachers' identify what resources they need to better plan and deliver NGSS aligned lessons? ● How well did the Reflection instrument work, and what changes do we need to make to the tool? ● What is the value to teachers of using their collective learning time to assess the quality of their instructional materials, and impact on the quality of their instruction? 	<p><i>How will you know whether this change is an improvement? What will you measure, and what data will you collect?</i></p> <p><u>Process Measures</u></p> <ul style="list-style-type: none"> ● Level of Engagement -- # of teachers who participate in Cycle 1 (who complete Reflection Instrument) and participated in the PLC meeting ● Teacher Reflection Instrument = data ● The PLC Protocol was followed by the school teams ● Teacher Exit Ticket from PLC meetings ● Are teachers following the protocol? What do they like, what do they not like? ● What was (most) helpful in the Reflection Instrument and PLC meeting in prompting their thinking about NGSS alignment 	<p><i>What are your targets or expectations for each test measure?</i></p> <p>*26/33 complete the Self-Reflection exercise (80% of teachers in both districts)</p> <p>*29/33 (90%) complete an Exit Ticket after PLC (proxy for teachers' commitment to working together to change their practice)</p> <p>*The majority of teachers share their self-reflections during the PLC</p>

Activity:

2. Do – Put Plan into Place

2a. Observations

What happened? Record a brief description of what happened during the test.

3. Study – Compare Your Predictions to What Occurred

3a. Predictions

Record predictions from Box 1d above.

3b. Results

How did your test perform on your measures?

3c. Learnings

What did you learn from this test?

4. Act – Determine Next Step

4a. Next Steps

What will you do based on what you learned? What are your next steps?

Maryland What Matters Now Network Learning Cycle #1

How is Maryland involved in the *What Matters Now* (WMN) Network?

Maryland is one of three states participating in a learning effort aimed at **improving student learning and achievement by focusing on enhancing the quality of professional learning, curriculum, and instructional materials**. Four secondary schools are participating in this guided improvement process: Benjamin Stoddert MS, the Potomac HS, Mace's Lane MS, and North Dorchester MS. A coalition consisting of teachers, district representatives, and state representatives meets regularly to plan and test ways to enhance professional learning at each school.

What is Maryland's "Problem of Practice?"

The Maryland coalition has identified the challenge of the consistent implementation of Next Generation Science Standards-based instruction and the performance of our secondary students on the new Maryland Integrated Science Assessment. Therefore, the Maryland Coalition's aim is:

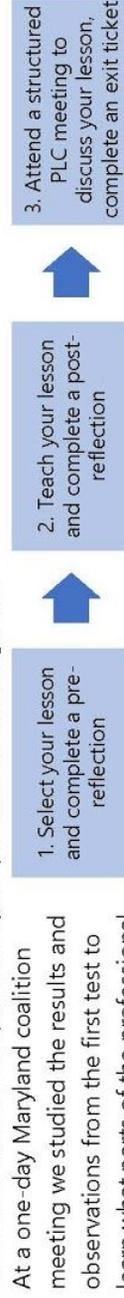
By May 2021 (the 2021 administration of the MISA), the teachers at the targeted schools will receive the professional learning and resources to equip students to meet or exceed state average results on the science assessment.

How are teachers involved in the MD WMN initiative?

You are one of 33 teachers trying out and providing input on the new forms of professional learning to determine how well the professional learning leads to improvements in student achievement. The coalition will use your feedback to strengthen the type of professional learning offered, hopefully benefitting both you and your students.

What did we test in our first learning cycle?

We tested out a new sequence for your professional learning time:

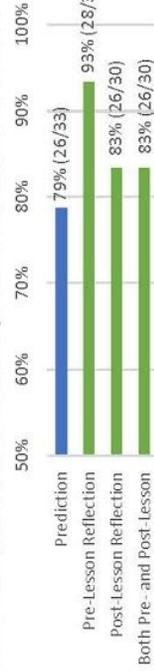


What did we learn?

How many teachers participated in the first cycle?

93% completed the Pre-Lesson Reflection, 83% completed the Post-Lesson Reflection. Only 63% of teachers completed the Exit Ticket.

Prediction 1: ~80% (26/33) of teachers complete the Self-Reflection Exercise



Prediction 2: ~90% (29/33) of teachers complete an Exit Ticket after PLC



How useful were the selected instructional materials?

Most teachers felt that the materials they used helped their teaching practice.

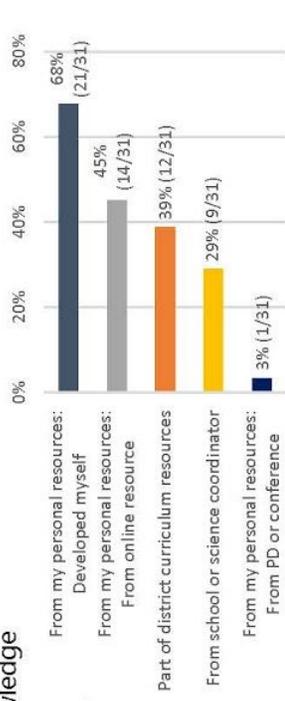
The instructional materials I used: (choose only one)



How did teachers get materials for their lessons?

Most teachers used a combination of personal knowledge and online resources to develop their lessons. Over half of teachers developed their lessons themselves.

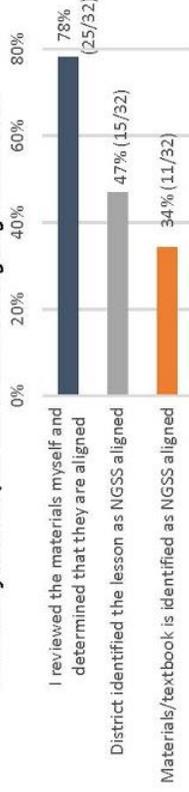
How did you get materials for the lesson?



How did teachers identify the lesson as being aligned to NGSS?

Most teachers rely on their own knowledge of NGSS to decide whether a lesson is NGSS-aligned or not.

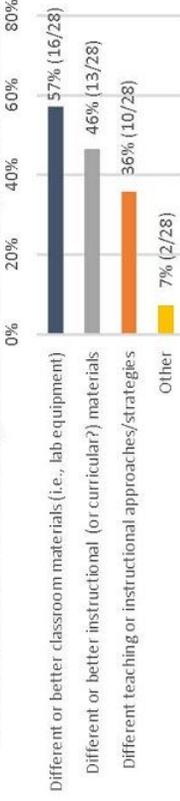
How have you identified this lesson as being aligned to NGSS?



What resources do teachers need to better plan and deliver NGSS aligned lessons?

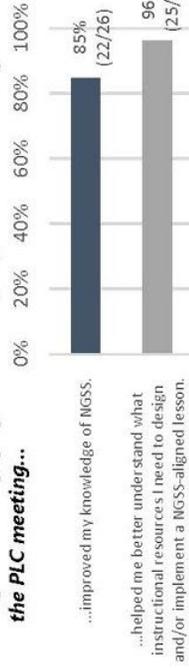
Many teachers cited a need for different or better classroom materials and instructional materials. In open-ended feedback, teachers cited cost of materials as a particular barrier.

To make this lesson even more effective, I would need... (choose one or more)

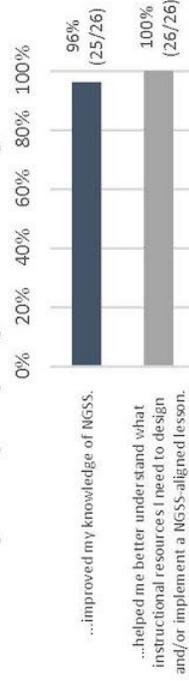


Does engaging in reflection through these instruments and through PLC meetings help teachers assess the standards-alignment of their lessons, and does it improve teaching? What other thoughts do teachers have regarding this reflection process?

I agree that engaging with the Self-Reflection instrument prior to the PLC meeting...



I agree that participating in the PLC meeting...



"In the reflection piece, I have to go back to NGSS to understand them again."

"The concern our PLC group had was the amount of time needed to complete the activity."

"Time frame is an issue. Are we simply doing micro-teaching here just for the sake of gathering data or are we implanting a lesson till everything is over before gathering the needed data?"

"I thought that it was helpful to see a variety of lessons went for a bunch of different teachers for different grades and teaching styles."

"The teachers that were required to work collaboratively were encouraged by the support that was provided to each other."

Conclusions

- Many teachers develop their own materials and decide independently if the materials are NGSS-aligned.
- Participation in reflection was high, and PLC meetings were useful; however, the demand on teacher time was too much.

Next Steps

- Modify, but not get rid of, the reflection process.
- Help teachers be better able to recognize and develop NGSS-aligned materials.
- XX will let you know what comes next!

Suggested Resources:

- The Center for Educational Innovation and Improvement at University of Maryland
Segun Eubanks, Director (SEubank2@umd.edu)
- Books:
Learning to Improve: How America's Schools Can Get Better at Getting Better by Anthony Bryk, et al;
Design-Based School Improvement by Rick Mintrop
- Short Videos on Improvement Science:
<https://vimeo.com/119352517>
<http://www.ihl.org/education/IHIOpenSchool/resources/Pages/BobLloydWhiteboard.aspx>
- Website (Carnegie Foundation)
<https://www.carnegiefoundation.org>
- UMichigan Free Online Course
<https://www.edx.org/course/improvement-science-in-education>