**Marysville SD Math-Science Partnership grant: *NGSS Pathways to Engineering***

**NGSS Lab Session 1**

This session follows the OEL Protocol Day 1, in a 7hour release day/in-service/Saturday.

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| 8:00 – 9:00  *AGENDA* | 1. Discuss key elements to include in this cycle: for continuous improvement of whole district    1. Goals for this year:       * 1. Science units with a learning progression, starting and ending with one engineering design project         2. Shifts in instruction that support the 3Dimensions of science learning    2. Reflect on our own learning about engineering, from UW externship July/Aug (ended with sci/eng module v.2.0)    3. Revisit the tools to use today:   our drafted course maps, from June  3Dimensions of science learning  Marysville best practices, from other NGSS Lab Cycles  Lead Teacher role = . | *My Notes* |

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| 9:00 – 10:30  *AGENDA* | 1. Content Study Phase: for each grade level    1. Build out the unit’s storyline to weave science and engineering    2. Revise the learning progression or course map, as needed   Lead Teacher role = . |  |

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| 10:30 – 3:30  *AGENDA* | 1. Unit Development: follow OEL Protocol to further develop/revise the science/engineering module v.3.0    1. Divide up into unit plan working groups, per signs:    * Attend to 3-dimensions of science learning for writing learning targets –and- assessment prompts    * Attend to Marysville best practices, from past NGSS Labs    * Attend to equity, access points for each and every student    1. Finalize the lesson/module document and supporting materials    2. Reflection for the day to prepare for session 2 and 3   Lead Teacher role = . |  |

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**NGSS Lab Session 2**

This session is a modification of the OEL Protocol for classroom observations and analysis of the evidence of student learning. In this format ALL teachers will implement the new lessons from the unit worked on during session 1.

The following is a list of tasks to be completed before you meet with your grade level PLC. Each task number corresponds to the successive task documents. This sheet in conjunction with the associated task documents will be used to verify participation for clock hours and payment for your time. Please initial and have a colleague initial each of the following sections upon completion then sign the bottom. Bring this page signed with you to the PLC.

***Teacher Colleague***

0./First time only

\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ **Video Analysis Training (0.5 hours)**

Video recording and analysis training.

1. \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ **Video Recording – Making-meaning portion of lesson (1.5 hours)**

Prepare to record class segments. Video record a portion or multiple segments of the engineering module planned by the group.

1. \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ **Student Work Analysis (1 hour)**

Review student work from the NGSS Lab Engineering Module. Sort student work, create a rubric, and complete questions.

1. \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ **Video Observation -- Evidence of Learning (1.5 hours)**

Watch your video/s and record observations.

1. \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ **Evidence Analysis and Instruction Reflection (1.5 hours)** - Reflect on the lesson, video analysis, and student work to evaluate the effectiveness of the instruction, make inferences of student engagement and learning. Complete 6 of the 12 supplied questions. *\*This portion may be modified and completed with the grade level group on an additional 2-hour PLC session should the group choose to meet twice.*
2. \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ **Prepare for PLC – To collaborate around instruction (1.5 hours)**

Prepare for the PLC by selecting a video clip to share, documenting the necessary changes to the module sequence either on the module document or separate notes to share, brainstorm possible generalization to practice from the module. *\*This portion may be modified and completed with the grade level group on an additional 2-hour PLC session should the group choose to meet twice.*

I affirm that I have completed each of the above tasks.

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*Printed Name/ School Signature Date*

**Session 2 Step 0/first time only Video Analysis Training**

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| 1. Review the following 3 videos about setting up video and using in your classroom.  [Using Video to Improve Practice: Video 101](https://www.teachingchannel.org/videos/videotaping-tips-for-teachers) [Using Video to Improve Practice: Do It Yourself!](https://www.teachingchannel.org/videos/improve-teaching-with-video)  [Using Video to Reflect on Teaching and Learning](https://www.teachingchannel.org/videos/use-video-to-improve-teaching-ousd)   1. Read [this](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjm_Z2y09jPAhVnh1QKHesWA_cQFggbMAA&url=http%3A%2F%2Fcepr.harvard.edu%2Ffiles%2Fcepr%2Ffiles%2Fl1a_teacher_video_selfie.pdf&usg=AFQjCNHjhAco7kgvW0L5d1pdc0GlPSQfag) article about guidelines for observing video and how to collect evidence of student learning.   [Teacher Video Selfie](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjm_Z2y09jPAhVnh1QKHesWA_cQFggbMAA&url=http%3A%2F%2Fcepr.harvard.edu%2Ffiles%2Fcepr%2Ffiles%2Fl1a_teacher_video_selfie.pdf&usg=AFQjCNHjhAco7kgvW0L5d1pdc0GlPSQfag) | My Notes |

**Session 2 1. Video Recording – making meaning portion of lesson**

***Questions to consider before recording:***

* 1. Who are the students that cannot be recorded in my class? (See list of students with “No Media Publishing” from secretaries)
  2. Who will I seek out for a video-buddy to make this process easier? Principal, curriculum director, science TOSA, colleague?

* 1. How will I prepare the students for the video recording?
  2. Which portion/s of the Engineering Module will be recorded?

Will I record the entire period or only certain portions?

***Helpful Hints from other teachers:***

* **Don’t** choose your best class - you’ll have a more interesting reflection and be able to learn more if you focus on students that are struggling conceptually.
* **Do** record multiple classes and/or different parts of the learning cycle
* **Do** make plans to prepare your students for the video recording.
  + Have a practice run or a few - You want an authentic view of your students.
  + If students are wary of the recording invite them to check out the screen when it’s set up to see what’s being recorded so they don’t think you’re focused on just them
* **Don’t** need to record an entire class period but be sure to include the making meaning portion
* **Do** determine where the focus of the camera be: student work surface, individual groups, whole class, etc.
* **Do** select a good vantage point for the camera
  + Small group - Tripod, students, teacher, colleague?
  + Large group - Avoid placing at the back of the classroom, try the side
  + At which 1-2 tables will you place the microphone?
* **Don’t** point the camera towards a backlit area of the classroom
* **Don’t** zoom or sweep with the camera
* **Do** remember to jot down notes after or during the lesson to help recall later:
  + Instructional challenges, learning goals, opinion on the lesson success, description of instructional materials you used, instructional practices that may not be apparent when watching the video later, etc.

**Session 2 2. Student Work Analysis**

*Complete this task before watching the classroom observation video.*

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| 2.1 Using 1 class period of student work samples, sort the student work into high/medium /low piles. Record the number of students in each category. | | |
| ***Level*** | ***# of students*** | ***Rubric Criteria*** |
| ***High*** |  |  |
| ***Medium*** |  |  |
| ***Low*** |  |  |

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| 2.2 My reflection:  What do I notice? What do I wonder?    What do my students know at this point, or what are they able to do now?  What problems or misunderstandings do my students still have? |

* 1. Determine the **Rubric Criteria** for each of the high, medium and low categories, in chart above.

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| * 1. Open the NGSS Labs Engineering Module plan, review the learning target and standards.   How well did the assessment match the learning target?  Which level of the standards did this assessment task achieve—introductory level, practice with the concepts, mastery level? |

**Session 2 3. Video Observation -- Evidence of Learning**

During the video record observations of student learning, focus only on data that shows student learning successes/struggles and ignore behaviors.

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| 3.1 My observations are recorded in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [on a Google doc, in notebook, or some other tool]  While watching the video, I should be attending to:   * Add timestamps to mark when something happened * Details and quotes about student thinking * Track who’s talking and how much they are talking about the learning target (vs. not on the target) * Instructional moves that pushed students to do deeper thinking * Any misconceptions that the students still hold * Does the instruction or discussion prompts facilitate extended discussion - Which parts enhanced discussion vs. which parts limited discussion? * Patterns that emerge in the learning * Record questions that you wonder while watching |

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| 3.2 After viewing the video, my ideas about the students’ learning include:  *[Noticings, Wonderings, Questions or Inferences]* |

**Session 2 4. Evidence Analysis and Instruction Reflection**

Respond to ***at least 4 of the 12 questions in addition to the 2 required questions*** below. In the “Student Evidence Box” sections record any evidence from student work or the video to help answer the question. Some questions may not be applicable or be observable in your video.

*\*This portion may be modified and completed with the grade level group on an additional 2-hour PLC session should the group choose to meet twice.*

***Required questions:***

***5th Grade Teachers - #5 & #9***

***6th/7th/8th Grade Teachers -* #7 & #9**

* 1. What is the extent of classroom involvement?

What percentage of the students were engaged intellectually with the science content?

How did I ensure equity for all students in the activity?

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| Student Evidence Box: |

* 1. What percentage of the class period was student centered and what percentage was teacher centered?

How often did students talk about the learning target concepts vs. how often did the teacher talk?

What percentage of the conversations were on task—about the learning target?

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| Student Evidence Box: |

* 1. Did the students meet the learning target?

How are they progressing towards the end goal for the Engineering Module?

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| Student Evidence Box: |

* 1. How did you connect with the students’ prior experiences and knowledge?

How will you build on the skills or concept development for future lessons?

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| Student Evidence Box: |

* 1. ***\*\*\*Required for 5\*\*\**** What elements of the lesson do you think helped the students gain a greater understanding of the concept?

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| Student Evidence Box: |

* 1. Are the students taking intellectual risks? How does the climate of the classroom and activity encourage risk taking?

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| Student Evidence Box: |

* 1. ***\*\*\*Required for 6/7/8\*\*\**** What specific changes could be done to move students from one level (think back to your rubric for student work samples) to the next?

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| Student Evidence Box: |

* 1. What are the instructional moves for the next lesson? Based on students struggles or success?

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| Student Evidence Box: |

* 1. ***\*\*\*Required for 5/6/7/8\*\*\**** What changes or revisions need to be made to the NGSS Engineering Module for next year?

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| Student Evidence Box: |

* 1. How did we make the content relevant to students? How could we make the content more relevant?

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| Student Evidence Box: |

* 1. What strategies in this lesson could be used in future lessons? How would you use them?

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| Student Evidence Box: |

* 1. How does this lesson support 3D learning and teaching?

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| Student Evidence Box: |

**Session 2 5. Preparation for the PLC**

*\*This portion may be modified and completed with the grade level group on an additional 2-hour PLC session should the group choose to meet twice.*

* 1. Select a video clip of the lesson about 5 minutes in length that I will share with my PLC colleagues. [either a highlight of student learning success or a student’s struggle]

START time \_\_\_\_\_\_\_\_\_\_\_ END time \_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. Gather support materials I added to the lesson/unit plan and upload to Google drive folder.

[student documents, materials for facilitating the engineering module, other]

* 1. Select the student work artifacts/products that I want to share with my PLC colleagues.
  2. Identify any Generalizations to Practice from the NGSS Lab Engineering Module that I want to share with my PLC colleagues.

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**NGSS Lab Session 3**

This session is a district wide grade-level PLC.

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| *1:20 -- 3:30*  *AGENDA* | *6th/7th/8th Grade:*   1. Analysis of learning 2. Share and discuss each teacher’s results from Session 2 video analysis. 3. Analysis of instruction 4. Further develop the course map to reflect instructional practices supporting 3D science learning. 5. Set plans for what we each will do differently in 6th 7th 8th grade classrooms during the next month. 6. Develop a common 3D assessment.   *5th Grade:*   1. Analysis of learning 2. Share and discuss each teacher’s results from Session 2 video analysis. 3. Have a clear understanding of the outcomes of the NGSS Lab Engineering Module and where we are going next. 4. Analysis of instruction 5. Identify and reflect on instructional practices supporting 3D science learning. 6. Set plans for what we will each do differently in 5th grade classrooms during the next month. | My Notes |

5.1 My professional growth steps, incorporating lessons learned from this NGSS-Lab Cycle, are: