Teaching and Learning with the Science and Engineering Practices

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Agenda

- Overview
- Discussion – Share Lessons Learned
- Activity 1: Defining Practice #1 - Asking questions and defining problems
- Activity 2: Analyze video for Asking questions
- Activity 3: Defining Practice #3 – Planning and carrying out investigations
- Activity 4: Analyze video for Investigations
- Conclusions and Discussion

PowerPoint at: http://www.katherinelmcneill.com
Goals for 5 Meetings

- Develop a deeper understanding of the 8 science practices in NGSS
  - Clarifying definitions of each practice
  - Explore the relationships between the 8 practices
- Develop strategies to adapt existing curriculum to align more closely with the science practices
  - Identify challenges around adapting (both student challenges and lesson design challenges)
  - Develop strategies for designing lessons
Share Lessons Learned

● With your group. Share your Lessons Learned from trying to integrate a practice into your instruction.

● Discussion
  ● What teaching strategies/activities would you recommend for adapting current science lessons?
  ● What challenges did your students have with the science practice?
  ● What challenges did you have adapting a lesson to target a specific science practice?
Activity #1: Defining Practice 1 – Asking Questions and Defining Problems

- On a large chart paper with your group:
  - What are the key characteristics of asking questions?
  - What are the key characteristics of defining problems?
  - How does this practice become more complex for students across grades k-12?

- Resources
  - Search NGSS for performance expectations for Practice 1
Activity #1: Defining Practice 1 – Asking Questions and Defining Problems

- Discussion:
  - What similarities and differences do we see across the definitions?
  - Can we agree on key elements that should be included in question and problems?
  - How will you know students “can do” this practice? What evidence will you use as the key indicators of proficiency?
Activity #2: Analyze video for Asking Questions

- Watch first 3:30 minutes from a 1st grade classroom beginning a unit on sound.

- Discussion Questions:
  - What key characteristics of questioning (from your group or the whole group discussion) does this video address? Why?
  - What key characteristics of questioning (from your group or the whole group discussion) does this video NOT address? Why?
  - How could you adapt this lesson to make it better address questioning?
Activity #2: Analyze Video

Essential Question: How do we hear sounds?
Activity #2: Analyze video for Asking Questions

- Watch first 3:30 minutes from a 1st grade classroom beginning a unit on sound.

Discussion Questions:
- What key characteristics of questioning (from your group or the whole group discussion) does this video address? Why?
- What key characteristics of questioning (from your group or the whole group discussion) does this video NOT address? Why?
- How could you adapt this lesson to make it better address questioning?
BREAK
Activity #3: Defining Practice 3 – Planning and carrying out investigations

- On a large chart paper with your group:
  - What are the key characteristics of planning and carrying out investigations?
  - How does this practice become more complex for students across grades k-12?

- Resources
  - Search NGSS for performance expectations for Practice 3
Activity #3: Defining Practice 3 – Planning and carrying out investigations

Discussion:

- What similarities and differences do we see across the definitions?
- Can we agree on key elements that should be included in planning and carrying out investigations?
- How will you know students “can do” this practice? What evidence will you use as the key indicators of proficiency?
Activity #4: Analyze video for Planning and carrying out investigations

- Watch 3:20- 7:20 And 16:00-16:30 from a 1st grade classroom beginning a unit on sound.

- Discussion Questions:
  - What key characteristics of investigations (from your group or the whole group discussion) does this video address? Why?
  - What key characteristics of investigations (from your group or the whole group discussion) does this video NOT address? Why?
  - How could you adapt this lesson to make it better address investigations?
Activity #4: Analyze Video

Essential Question: How do we hear sounds?
Activity #4: Analyze video for Planning and carrying out investigations

- Watch 3:20- 7:20 And 16:00-16:30 from a 1st grade classroom beginning a unit on sound.

Discussion Questions:
- What key characteristics of investigations (from your group or the whole group discussion) does this video address? Why?
- What key characteristics of investigations (from your group or the whole group discussion) does this video NOT address? Why?
- How could you adapt this lesson to make it better address investigations?
Discussion

- Asking questions and defining problems
  - Questions play an essential role in science classrooms and in school more broadly.
  - Not all questions in science classrooms align with the “science practice” in NGSS

- Planning and carrying out investigations
  - The focus on carrying out investigations seems similar to previous focus on inquiry.
  - Identifying opportunities where students can “plan” investigations, rather than being given procedures” can be more challenging.
Next Time: Plan to Try out a Practice before April 29

● Before our next meeting on April 29, we would like you to engage your students in either Asking Questions/Problems or Investigations

● For the meeting on April 29, please bring:
  ● Planning sheet that identifies the target practice and a “lessons learned” (e.g. lesson challenge, student challenge, strategy).
  ● Lesson artifacts – Bring in something to share to illustrate the “lesson learned” such as a powerpoint to illustrate a strategy or student writing to illustrate a challenge.

  *If you were comfortable, we would like to collect the planning sheets and artifacts to help us synthesize the lessons learned.*
Feedback for Future Planning

● Positives
  ● What aspects of the past 2 workshops have been positives and you would like to see in the future workshops? Why?

● Negatives
  ● What aspects of the past 2 workshops have been less successful? Why?

● Future
  ● What would you like to spend time on during the last 3 workshops? Why?
Contact Information

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- Workshops
  - Has the powerpoint

- Teaching Resources
  - Links to other webpages (e.g. argument assessments, lessons, etc.)