Teaching and Learning with the Science and Engineering Practices

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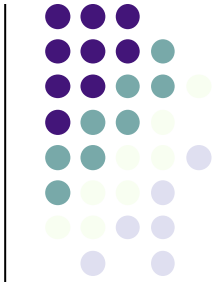
Boston Public Schools

Agenda



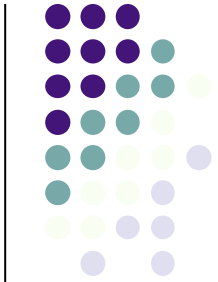
- Overview
- Discussion – Share Lessons Learned
- Activity 1: Defining *Practice #1 - Asking questions and defining problems*
- Activity 2: Analyze video for *Asking questions*

BREAK

- Activity 3: Defining *Practice #3 – Planning and carrying out investigations*
- Activity 4: Analyze video for *Investigations*
- Conclusions and Discussion

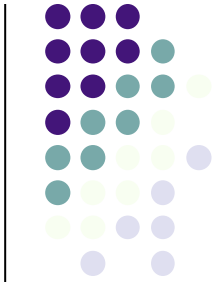
PowerPoint at: http://www.katherinelmcneill.com

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?

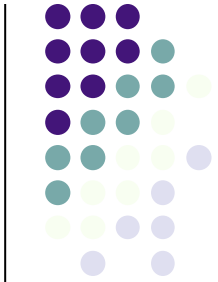
Activity #1: Defining Practice 1 – *Asking Questions and Defining Problems*

- 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
  - 4 Handouts - Appendix F. BSCS definitions, Science Practices Leadership definitions, Potential instructional activities.
  - Search NGSS for performance expectations for Practice 1

Activity #1: Defining Practice 1 – *Asking Questions and Defining Problems*

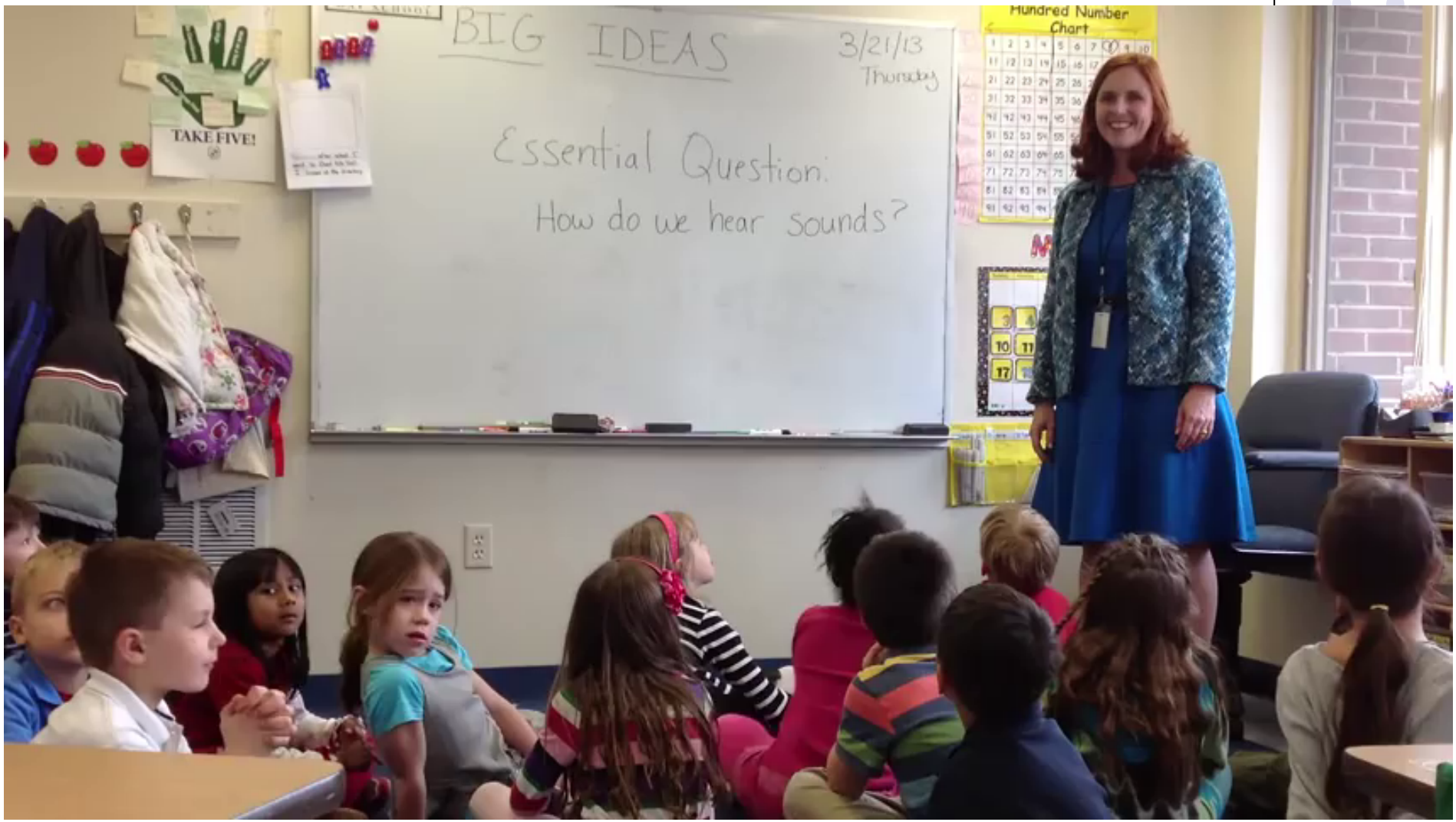
- Discussion:
  - What similarities and differences do we see across the definitions?
  - Can we agree on key elements that should be included in *question* and *problems*?
  - How will you know students "can do" this practice? What evidence will you use as the key indicators of proficiency?

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



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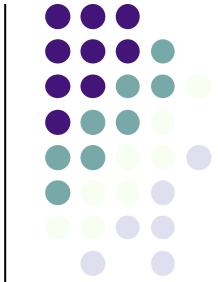

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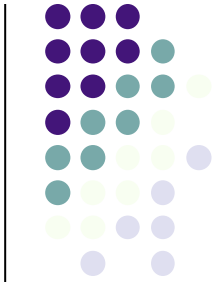
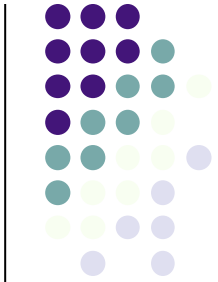
BREAK

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
  - 4 Handouts - Appendix F. BSCS definitions, Science Practices Leadership definitions, Potential instructional activities.
  - Search NGSS for performance expectations for Practice 3

Activity #3: Defining Practice 3 – *Planning and carrying out investigations*

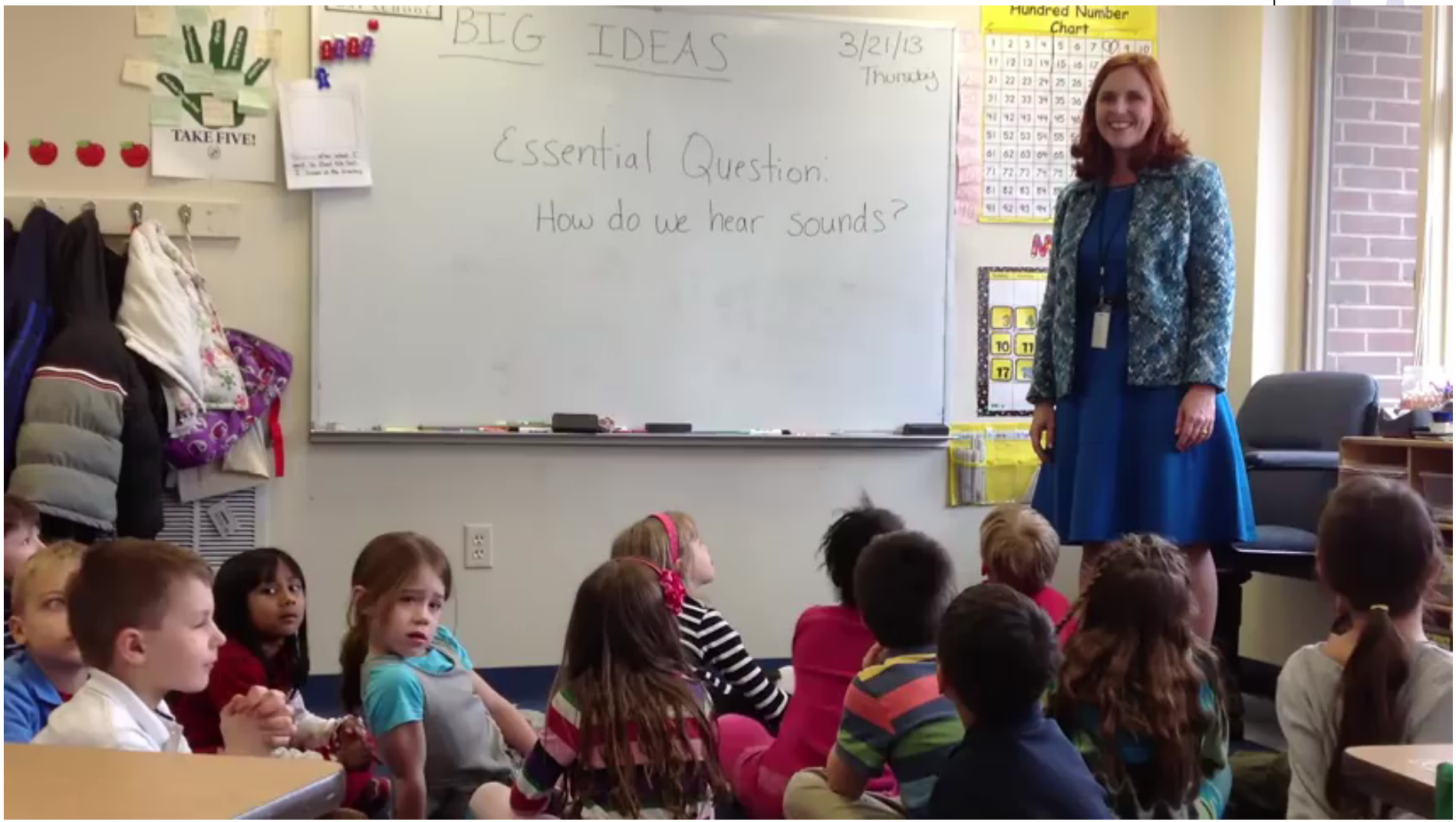


- Discussion:
  - What similarities and differences do we see across the definitions?
  - Can we agree on key elements that should be included in *planning and carrying out investigations*?
  - How will you know students "can do" this practice? What evidence will you use as the key indicators of proficiency?

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



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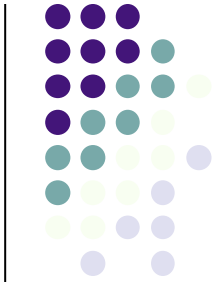
Discussion

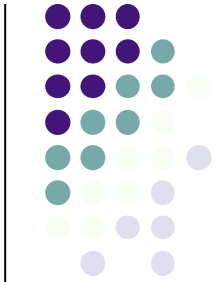


- Asking questions and defining problems
  - Questions play an essential role in science classrooms and in school more broadly.
  - Not all questions in science classrooms align with the “science practice” in NGSS
- Planning and carrying out investigations
  - The focus on carrying out investigations 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

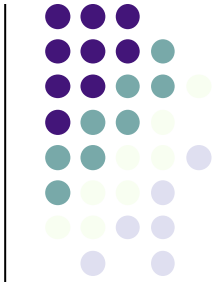
- Before our next meeting on April 29, we would like you to engage your students in either *Asking Questions/Problems* or *Investigations*
- For the meeting on April 29, please bring:
  - Planning sheet that identifies the target practice and a "lessons learned" (e.g. lesson challenge, student challenge, 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



- Kate's e-mail – kmcneill@bc.edu
- Maria's e-mail – gonzaldx@bc.edu
- Pam's e-mail - ppelletier@bostonpublicschools.org

http://www.katherinelmcneill.com

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