**Conclusion**

*Time: 45 minutes*

**Goals:**

* Consider which science practices will require the greatest shift in your current science instruction.
* Explore how the science practices typically occur synergistically and not just one at a time.
* Reflect on the importance of students engaging in the science practices, and not just the teacher demonstrating the science practices.
* \*Create a representation of the relationships among the eight science practices.
* \*Evaluate a lesson plan from existing science curricula to consider which science practices are included.

*\*If the extension activity is completed*

**Materials:**

* Science Practices Cards (cut cards in advance)
* Gradient Template
* Grade 5 Classroom Vignette
* NGSS Implementation Guidelines
* Science Practices Continuum *(If the extension activity is completed)*

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| **Activity** | **Description** | **Time** |
| Science Practices Card Sort | * Explain to teachers that now that they have become more familiar with the eight science practices you want them to reflect on which of the science practices are more and less prevalent in their current science instruction.
* Give each teacher a set of Science Practices Cards and the Gradient Template handout for ordering the science practices. Have them rank the cards in order of the science practice they think is currently *most* prevalent in their science instruction to the science practice that is *least* prevalent in their science instruction.
* Have the teachers get together in pairs and share with a partner their ordering of the science practices and their rationale behind the order.
* After completing the activity, discuss the rankings with the whole group:
	+ What science practices do you currently incorporate most frequently? Why?
	+ What science practices do you currently incorporate least frequently? Why?
	+ What are some strategies you could use to include some of the more rare science practices in your instruction?
 |  15 min |
| Examine a Classroom Vignette | * Tell teachers that while we have been focusing on one science practice at a time as an introduction, often students engage in multiple science practices in one lesson

*\*Note: However, it is important to point out that even if you could find all eight science practices in one lesson, you should highlight no more than a few in any one lesson.** Handout the Grade 5 Classroom Vignette (which is from the ILSP website). Ask teachers to read through the vignette and identify which of the science practices they see in the lesson.
* After the teachers have completed the task, ask a few teachers to share out which science practices they identified and where they saw them in the vignette.
	+ During this discussion, stress that often two or three science practices may be incorporated in a single lesson.
* You may choose to show teachers the web version of the 5th grade vignette that highlights and further describes three of the science practices in the vignette - <http://www.sciencepracticesleadership.com/exemplar---grade-5---planning.html>
	+ Turning on/off the commentary on this page allows you to view the teacher moves and student discourse around the focal science practices
 | 10 min |
| Analyze a Video  | * Introduce how one key difference in the new science standards is that students should be doing the science practices (not just the teacher). New standards show a significant shift in describing students “learning about” science phenomena to now “figuring out” science phenomena.
* Distribute the NGSS Implementation Guidelines handout, which describes this “learning about” to “figuring out” shift in more detail. Encourage teachers to use this handout as they analyze the video.
* Tell teachers they will be examining the first 4 minutes and 10 seconds of a video from a middle school science classroom. This video is from a lesson on decomposition in which students are providing their initial explanations of what is occurring to strawberries that have been left in a bag.
	+ The video is from the Tools from Ambitions Science Teaching website under “Days 3, 4 Initial explanations of decomposition” - <http://ambitiousscienceteaching.org/video-series/middle-school-fungi-and-life-processes-legacy-series/>
* Prompt teachers to consider the following questions while watching the video:
	+ Do you see any science practices in this video? If so, where did you see them?
	+ What are the roles of the teacher and the students?
	+ How well do you think this video encompasses the shift from “learning about” to “figuring out”?
	+ What are some ways the initial discussion could have been revised to include a greater focus on a science practice?
* After the video viewing, facilitate a group discussion around the questions previously listed.
 | 15 min |
| Discussion | * Highlight for the teachers some key points in relation to the science practices:
	+ Science practices are a significant shift in instruction that will take time and support to implement into current instruction.
	+ This shift includes a greater focus on student directed instruction in which students use evidence to make sense of the natural world (“learning about” versus “figuring out”).
	+ The science practices work synergistically together and not in isolation.
	+ The potential gain is greater when one does not try to do too much – students cannot attend to all of the practices at the same time. It is okay for a lesson to focus on one or two science practices.
* Facilitate a whole discussion around the questions:
	+ What questions do you still have about science practices?
	+ What supports might you need to better integrate science practices into your instruction?
 | 5 min |
| Extension – Creating a Representation of the 8 Science Practices  | * Work Time:
	+ Provide teachers with time to work in groups to develop a representation of the eight science practices. Have them consider the relationships between the practices and how they might convey these to teachers less familiar with the science practices.
* Share Out:
	+ Have each group share out their representation.
	+ After each group has shared, discuss the strengths and weaknesses of the different representations.
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| Extension – Analyze a Current Lesson Plan | * Have one (or more) teachers share a lesson plan from their current science curriculum to evaluate in terms of the science practices. Make copies of the lesson plan and have all of the teachers read and analyze. While teachers analyze the lessons, encourage them to consider:
	+ What science practice(s) are included?
	+ How student directed is the lesson?
* You may choose to have the teachers use the Science Practices Continuum from the ILSP website to focus their analysis and evaluate the level of opportunities for student engagement in the science practices.
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