**Asking Questions**

*Time: 45 minutes*

**Goals:**

* Develop an understanding of what it means for students to engage in “asking questions”
* Engage in the science practice of asking questions
* Explore how student engagement in this science practice progresses across grades

**Materials:**

* Question Sentence Starters handout
* Sticky notes (i.e. post-its)
* Snails Lesson Plan handout
* Snails Activity handout
* If live snails are used for the Snails Activity:
  + 2 or 3 snails will be needed per small group of teachers. Each snail should be individually placed in a covered cup.
  + Hand lenses for viewing the snails
* NSTA Science Practices Progression handout (pg. 1)

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| **Activity** | **Description** | **Time** |
| Asking Questions About Discrepant Events | * Explain to participants that discrepant events are a helpful way to prompt students to generate authentic questions in the science classroom * In small groups, have participants go to the following website: https://www.youtube.com/playlist?list=PL7F82281E7CF467AB, and allow each group to select a video of a discrepant event to watch.   + Pass out the Question Sentence Starters handout and sticky notes, and ask each participant to write on a sticky note one question that comes to mind after watching their video   + After a few minutes, have some participants share out the questions they developed about their discrepant event * Afterwards, share and read the definition of this science practice from sciencepracticesleadership.com (the text is displayed on the website in both the Slideshow and the scroll view)   + Emphasize that questions that fall under this science practice must be testable   + Encourage participants to think about this definition and how it relates to the questions that they generated. * Facilitate a whole group discussion around these questions:   + Do any of the discrepant event questions align with the definition of the science practice of “asking questions?”     - If yes, which one(s) and why?     - If no, why not?   + What do you feel is an advantage and/or a disadvantage of having students use the Question Sentence Starters handout to ask questions? | 10 min |
| Snails Activity | * Explain the context of this activity to participants. This activity comes from the FOSS 7th grade unit on Diversity of Life. Before students observe the snails, they are asked to write what they already know about snails, and what they would like to learn about these organisms. If participants want more information about the lesson from which this activity came from, give them the Snails Lesson Plan handout * Pass out the Snails Activity handout, and give participants time to write down questions that they have about snails *before* making observations. * Then, allow participants a few minutes to make observations of either live snails, or to view one or two snail videos. Recommended snail videos include:   + <https://www.youtube.com/watch?v=5qmAoTSw63w>     - Shows a snail crawling on pavement outside.   + <https://www.youtube.com/watch?v=X2euuvp7xAA>     - Shows the underside of a snail, crawling on glass. You can see how it moves and its mouthparts and tentacles moving.   + <https://www.youtube.com/watch?v=caZ8OXuRaVk>     - Shows a snail eating lettuce. * Encourage participants to think about how their observations might have prompted new questions. Afterwards, ask participants to record questions that they develop *after* making observations on the handout. * Remind teachers of the definition of this science practice, noting that testable questions are the kinds of questions that fall under this science practice. Ask teachers to work in small groups to sort the questions that they developed about snails (those both before and after the observations) into the categories of “testable questions” and “untestable questions” * Facilitate a whole group discussion around these questions:   + What group (testable or untestable) did most of the questions that you generated fall under? Why do you think this is the case?   + Where there any questions that you found difficult to sort? What about these questions do you think made them challenging to sort? | 15 min |
| Unpacking The Science Practice | * Show the graphic from the sciencepracticesleadership.com website that illustrates how the three groups of science practices (Investigating, Sensemaking, Critiquing) work together   + Remind participants that they saw and discussed this graphic during the Introductory Module   + Explain that “asking questions”, which falls under the group of Investigating Practices, usually begins with an observation of the natural world that leads to data collection in an attempt to find an answer. Questions can also be generated about data, models, and explanations. * Read the descriptions from Appendix F of the NGSS of what “asking questions” looks like in the science classroom * Facilitate a whole group discussion around these questions:   + What benefits do you think engaging in this science practice has for students?   + What do you think your students would find challenging about asking scientific (i.e. testable) questions? How could you help them with these challenges? | 5 min |
| How Asking Questions Progresses Across Grades | * Inform teachers that student engagement in this science practice progresses throughout grades K-12. Pass out the NSTA Science Practices Progression handout, and conduct a think-pair-share in which participants read what “asking questions” looks like in different grade bands, and then discuss:   + How are students “asking questions” in these grades?   + How does their engagement in this science practice progress across the grade bands being focused on?   *\*Note:* *First do this for grades K-2 and 3-5, and then for grades 6-8 and 9-12.*   * Afterwards, facilitate a whole group discussion around the following questions:   + In what ways did you engage in “asking questions” during the discrepant events and the snails activity?   + What questions do you still have about this science practice? | 10 min |