Science Practices Continuum – Students' Performance

This continuum is intended for teachers and administrators to use in guiding and evaluating student performance in the science practices. The levels reflect increasingly sophisticated engagement in the practices and are not grade-level specific; students can engage in the practices in developmentally appropriate ways at any of these levels. Appendix F in the NGSS provides significantly more detail for each practice (that should be integrated as both students and teachers develop greater fluency with each practice). The practices are grouped into the "Investigating" "Sensemaking" and "Critiquing" practices.

		Level 1	Level 2	Level 3	Level 4
Investigating Practices	1. **Asking questions**	Students do not ask questions.	Students ask questions. Students' questions are both *scientific* and *non-scientific* questions (i.e., not answerable through the gathering of evidence or about the natural world).	Students ask questions. Students' questions are typically *scientific* (i.e. answerable through gathering evidence about the natural world). Students *do not evaluate* the merits and limitations of the questions.	Students ask questions. Students' questions are typically scientific (i.e. answerable through gathering evidence about the natural world). Students *do evaluate* the merits and limitations of the questions.
	3. **Planning and carrying out investigations**	Students do not design or conduct investigations.	Students conduct investigations, but these opportunities are typically *teacher-driven*. Students do *not* make decisions about experimental variables or investigational methods (e.g. number of trials).	Students *design or conduct* investigations to gather data. Students make decisions about experimental variables, controls *or* investigational methods (e.g. number of trials).	Students *design and conduct* investigations to gather data. *Students make decisions* about experimental variables, controls *and* investigational methods (e.g. number of trials).
	5. **Using mathematics and computational thinking**	Students do not use mathematical skills (i.e., measuring, estimating) or concepts (i.e., ratios).	Students use mathematical skills or concepts but these are *not connected to answering a scientific question.*	Students use mathematical skills or concepts to *answer a scientific question.*	Students *make decisions* about what mathematical skills or concepts to use. Students use mathematical skills or concepts to answer a scientific question.

Sensemaking Practices	2. **Developing and using models**	Students do not create or use models.	Students create or use models. The models focus on *describing* natural phenomena rather than predicting or explaining the natural world. Students *do not evaluate* the merits and limitations of the model.	Students create or use models focused on *predicting or explaining* the natural world. Students *do not evaluate* the merits and limitations of the model.	Students create or use models focused on *predicting or explaining* the natural world. Students *do evaluate* the merits and limitations of the model.
	4. **Analyzing and interpreting data**	Students may record data, but do not analyze data.	Students work with data to organize or group the data in a table or graph. However, students *do not recognize patterns or relationships* in the natural world.	Students work with data to organize or group the data in a table or graph. Students make sense of data by *recognizing patterns or relationships* in the natural world.	Students *make decisions* about how to analyze data (e.g. table or graph) and work with the data to create the representation. Students make sense of data by *recognizing patterns or relationships* in the natural world.
	6. **Constructing explanations**	Students do not create scientific explanations.	Students attempt to create scientific explanations but students' explanations are *descriptive* instead of explaining how or why a phenomenon occurs. Students do *not* use appropriate evidence to support their explanations.	Students attempt to create scientific explanations but students' explanations are *descriptive* instead of explaining how or why a phenomenon occurs. Students *use appropriate evidence* to support their explanations.	Students construct explanations that focus on explaining *how or why a phenomenon occurs* and *use appropriate evidence* to support their explanations.

Critiquing Practices	7. **Engaging in argument from evidence**	Students do not engage in argumentation.	Students engage in argumentation where they support their *claims with evidence or reasoning*, but the discourse is primarily *teacher-driven*.	Students to engage in *student-driven argumentation.* The student discourse includes *evidence and reasoning* to support their claim. Students also agree and disagree, but rarely engage in critique.	Students engage in *student-driven argumentation*. The student discourse includes evidence, reasoning that links the evidence to their claim and *critique* of competing arguments during which students build on and question each other's ideas.
	8. **Obtaining, evaluating, and communicating information**	Students do not read text for scientific information.	Students read text to *obtain* scientific information, but do *not evaluate* this information. Students also do *not* compare or combine information from multiple texts considering the strengths of the information and sources.	Students *read and evaluate* text to obtain scientific information. Students do *not* compare or combine information from multiple texts considering the strengths of the information and sources.	Students *read and evaluate* text to obtain scientific information. Students *compare and combine* information from multiple texts considering the strengths of the information and sources.

Classroom Culture Prioritizing Science Practices

Less ---More

Connected to the Natural World
Focused on Scientific Evidence
Student Directed and Collaborative
Informed by Critique