



# Implementing the NM STEM Ready! Science Standards

## Science and Engineering Practices

An instructional shift of the NM STEM Ready! Science Standards involves students actively seeking solutions, designing investigations, explaining new learning, and asking new questions of their own (Daehler and Folsom, 2016). Sense making requires students to be engaged in understanding the world by generating, using, and extending scientific knowledge around a phenomenon (Schwarz et al., 2017). When classrooms focus science education on application [phenomenon] then students are motivated to explain and the focus of learning shifts from learning about a topic to figuring out why or how something happens. *A Framework for K–12 Science Education* emphasizes eight practices that scientists and engineers use in their profession and that students utilize in their K–12 science education. Asking questions, one of the eight practices, makes science more meaningful for students and helps shape their worldview.

## Asking Questions

Asking questions in the NGSS revolves around building knowledge/understanding to explore and explain phenomena. Teachers and students are partners in asking questions, leading to investigating anchoring and investigative phenomena. Students always bring their prior knowledge when engaging in sense making of phenomena and ask questions focused on aspects of phenomena that are unknown to investigate. Teachers help guide students' discussions/questions to uncover these gaps and produce questions leading to investigating phenomena. As students engage in sense making, their questions may be answered or lead to new or refinement of existing questions; to planning and carrying out an investigation to explore gaps in understanding of phenomena, or lead to revising explanations or models. Asking questions is not limited to the introduction of phenomena but is ongoing.

## Classroom Practice - The Driving Question Board

Engaging students in a shared, contextual anchor phenomenon naturally immerses them in sense making to figure out the phenomenon. From the shared experience, students discuss what they know with their peers, coming to a consensus or shared understanding. Questions drive what it is about a phenomenon that needs to be explained. At this initial stage of the activity, students write down questions they still have of the anchor phenomenon and post them on a public space on the classroom wall, a driving question board. The driving question board shares un-answered questions, answered questions, or new questions arising from investigations. The driving question board illustrates gaps in students' understanding around the phenomenon and leads to the investigations students carry out, helping fill in those gaps. Revisiting the driving question board allows students to share answers to questions or add new questions arising from investigations.

### References:

Daehler, K., and Folsom, J. (2016). *Making Sense of SCIENCE: Phenomena-Based Learning*. Retrieved from: <https://we-mss.weebly.com/>  
Schwarz, C.V., Passmore, C., & Reiser, B.J. (2017). *Helping students make sense of the world using next generation science and engineering practices*. Arlington, VA: NSTA Press, National Science Teachers Association.



Reach out to the [Math and Science Bureau staff](#) with questions or for more information.

## Did You Know?

STEM Teaching Tools have [question frames](#) to help students/teachers facilitate exploration of phenomena.

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