

NCSE's Approach to Driving Question Boards



The driving question board (DQB) holds a special place in NCSE materials because it powerfully supports our goal of [resolving misconceptions](#). In addition, a DQB accurately represents the process of scientific inquiry and sends a powerful message to students about their role as sensemakers. Using a DQB provides a concrete way to uncover students' misconceptions and guides the inquiry process in resolving those misconceptions.

There are many different ways to implement a DQB, and each teacher is encouraged to determine what works best for their particular context. Having students write on sticky notes organized on a poster or bulletin board is the most common method, but some teachers use digital tools or other strategies. At a minimum, the DQB is a collection of students' questions about a phenomenon or problem that is publicly developed at the beginning of a learning cycle. However, the DQB can also become a space for categorizing questions, organizing ideas, and tracking what students have figured out. When used this way, the DQB becomes a roadmap for all of the stages of sensemaking rather than just an activity at the beginning of a new unit.

NCSE recommends the roadmap approach to the DQB because it makes the process of uncovering and resolving misconceptions visible in the classroom and creates a shared purpose for learning. However, if implementing a DQB feels intimidating, start with only student questions and add new elements as you become more comfortable with the process.

There are three keys to effectively using a DQB to support students' sensemaking with an [NCSE Story Short](#):

Key #1: Clarity

The teacher must deeply understand how ideas build throughout the Story Short and should be explicit in their explanation of how the DQB will guide students' sensemaking to answer the driving question.

NCSE Story Shorts were designed to specifically target one or more common misconceptions. The required activities were intentionally sequenced to allow students to engage with evidence in a way that makes sense from their perspective. The Side Quests provide optional activities based on the questions that students ask and their background knowledge. It is essential that the teacher studies the Story Short Overview carefully and understands how and when new ideas will be introduced so that they avoid inadvertently doing the work of sensemaking for students by giving away answers or introducing new concepts before they are ready. When the teacher is clear on the learning goals and understands how the sequence of learning activities will guide students toward answering the driving question, they can facilitate discussions in a way that makes the students feel like their ideas and questions are driving the learning.

Key #2: Scaffolding

Asking productive scientific questions is a skill that requires intentional scaffolding and lots of practice.

Asking questions is a scientific practice teachers must explicitly teach, and students must practice repeatedly. Productive scientific questions are open-ended yet specific and focus on cause-and-effect relationships. “Scientific questions are distinguished from other types of questions in that the answers lie in explanations supported by empirical evidence, including evidence gathered by others or through investigation” (NGSS Appendix F). Successfully using a DQB to drive learning requires a classroom culture where students feel [comfortable sharing their ideas](#). One of the main difficulties teachers experience when first implementing DQBs is that students ask questions they already know the answer to or opt out of the process by saying, “I don’t have any questions.” These behaviors are clear indications that students don’t have the skills necessary to ask productive scientific questions. NCSE recommends having students first write and share their ideas about the phenomenon.

Sharing ideas activates prior knowledge, builds’ students’ confidence, and allows the teacher to identify misconceptions. As students share ideas, they naturally challenge each other’s thinking and consider new perspectives. This process leads students to develop questions about areas in which there is not a clear consensus. Another challenge teachers face is how to deal with questions that don’t align with the learning goals. Students will always ask interesting questions about topics that are outside the curriculum. It is important to affirm that while these are interesting questions, they aren’t directly related to the driving question so they won’t be addressed in this learning cycle. Other questions alert the teacher to missing background information or are so engaging that they are worth exploring. Many of these “nice to know” questions are addressed in the Side Quests. Teachers may also consider making their own Side Quest activity to address an interesting question raised by their students.

Key #3: Consistency

The teacher should refer to the DQB each class period and point out how students’ ideas and questions are moving the learning forward and which misconceptions have been resolved.

The students will see the DQB's benefit only when the teacher intentionally models how it drives the learning process. If the DQB is just an activity you do on the first day of a new unit but never refer to again, students will quickly infer that it has little value. However, when referred to often in a meaningful way, the DQB can serve as a powerful reminder of a shared purpose for learning and help to define the role of the teacher as a facilitator and the students as sensemakers. A DQB also becomes more meaningful when new questions are added throughout the learning cycle and answers to questions are added to the board as they are developed.

How to Manage the Logistics of a DQB

There is no “right way” to do a DQB. Each teacher needs to find what works for them and their students. For example, some teachers prefer to have a poster or space on the wall for each class period, while others prefer to make one DQB for all class periods using the same storyline. Using one DQB across class periods is often more manageable for the teacher and allows them to “seed” ideas and questions from one class period to another. NCSE recommends using three columns on a DQB: *Our Ideas*, *Our Questions*, and *What We Figured Out*. It is helpful if the teacher organizes students’

questions into categories that roughly match the different learning activities in the Story Short. This strategy helps students connect each activity back to their questions and see the relevance of their learning.

