Resources to Build Common Understanding

Instructional materials programs designed for the NGSS include the criteria as described in the "More of this" column of these charts.

Use Phenomena/Solve Problems		**Student actions/teacher actions**
Less of this …	**More of this …**	**How might "More of this…" look in Instructional Materials?**
Making sense of phenomena and designing solutions to problems may be used occasionally as engagement strategies but are not a central part of student learning.	Phenomena and designing solutions to problems are central to student learning and require the application of grade-appropriate SEPs, CCCs, and DCIs for sensemaking.	*The materials ask students to write or communicate an explanation of the phenomenon/a and revisit that explanation a few lessons later for refinement based on additional science they learned.*
Topics, rather than phenomena, are used to direct student learning experiences and are not necessarily designed to answer student questions.	Phenomena are relevant and engaging to student learning and cause students to ask questions that they want to answer.	
Only talking or reading about phenomena or how other scientists and engineers are engaged with phenomena and problems	Students experience phenomena directly or through rich multimedia.	

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*Statements adapted from ACESSE Survey, Citations for ACESSE Survey:

- Penuel, W. R., Weidler-Lewis, J., & Van Horne, K. (under review). Developing a measure of teachers' vision for equitable science teaching and learning. Journal of Science Teacher Education.
- Weidler-Lewis, J., Penuel, W. R., & Van Horne, K. (2017, April). Developing a measure of teachers' vision for equitable science teaching and learning. Paper presented at the NARST Annual Conference, San Antonio, TX *Statements adapted from ACESSE Survey

Students Figuring Out Phenomena or Solving Problems		Student actions/teacher actions
Less of this …	**More of this …**	**How might "More of this…" look in Instructional Materials?**
Learning science that may be relevant to adults and may be useful to students someday in their lives*	Learning science that is personally relevant to student lives*	*The instructional material asks students to make connections to their lives as well as provides phenomenon/a that can be connected to students' experiences or provides a relevant shared experience in class.*
Using science practices and crosscutting concepts only to serve the purpose of students acquiring more DCI information	Careful design to build student proficiency in all three dimensions of the standards	
Learning experiences are 1–2 dimensional or marginally connected to one another and provide limited opportunities to use the dimensions together to make sense of phenomena or solve problems	Multiple opportunities, experienced in a logical sequence, to use the three dimensions to make sense of phenomena or solve problems	
Learning experiences are designed for the "right answer".	Learning experiences are designed so that initial explanations for phenomena are negotiated and revised over time as understanding increases in complexity.*	
Rote memorization of facts and terminology; providing discrete facts and concepts in science disciplines, with limited application of practice or the interconnected nature of the disciplines	Facts and terminology are learned as needed while developing explanations and designing solutions supported by evidence-based arguments and reasoning.	

Resources to Build Common Understanding

Three-Dimensional Performance		Student actions/teacher actions
Less of this ...	**More of this …**	**How might "More of this…" look in Instructional Materials?**
Teachers only posing questions that have one correct answer and/or measure understanding in one moment in time	Teachers posing questions that elicit the range of student understanding and capture student thinking over time	*Instructional materials model open-ended questions for teachers to ask to further student thinking and possible student responses. Guidance is provided for responding to student ideas (i.e. which responses need addressing at that time and which responses will require more time and student learning to address.)*
Only providing summative assessments that measure the end point of student understanding	Formative assessment processes embedded into instruction to provide feedback data to adjust instruction as well as inform students of their progress	
Assessments that focus on one dimension at a time and are mostly concerned with measuring students' ability to remember information	Assessments reflect each of the three distinct dimensions of science, their interconnectedness and their use by students to figure out phenomena or solve problems.	
Assessed on core ideas of science*	Students' increasing grasp of science and engineering practices helps them to develop understanding of the core ideas and crosscutting concepts.*	
Students are assessed in the same way to reveal the achievement gaps.*	Student experience multiple measures and types of assessment to show the range of understanding about something being learned.*	