NGSS Classroom Observation Tool

The NGSS Classroom Observation Tool is a collaborative tool for teachers and administrators, as well as groups of teachers, to identify the school's instructional implementation of the NGSS and the professional learning support needs. It is NOT to be used for evaluation purposes, but rather as a discussion of where teachers and students are, and how to move forward in their NGSS practices. *This tool is based on the work of the Science Partnership at Alameda County Office of Education and CSU East Bay, BaySci at Lawrence Hall of Science, and the K12 Alliance at WestEd Early Implementation Initiative.

The tool features three rubrics to address the major shifts required by the NGSS:

1. Phenomena-based Instruction

2. 3-Dimensional Sensemaking

3. Student-to-Student Discourse

The tool is designed to capture teaching and learning by characterizing teacher behavior and student behavior for each of the components of the rubrics. The rubric spans novice to NGSS practices through expert with NGSS practices. The terms novice, emerging, experience, and expert refer to the teacher's use of the shifts required by the NGSS, and NOT to their years of teaching.

Recommended use of this tool is to identify one rubric and even one component of that rubric, to observe and discuss findings from the observation. After the discussion, teachers and administrators should select another component of the same rubric, or another rubric and its components that meet the needs of the teachers or the site as a whole.

NGSS Classroom Observation Tool
Phenomenon-Based Instruction

Components	NGSS Implementation: Novice	NGSS Implementation: Emerging	NGSS Implementation: Experienced	NGSS Implementation: Expert
Design for Phenomenon-Based instruction	• Teacher provides activity for students to investigate	• Teachers identify phenomenon (a) but the learning sequence does not help students make sense of the phenomenon	• Teachers provide content rich experiences, e.g., hands-on-activities, video depiction, or simulation of the phenomenon	• Teacher selects appropriate phenomenon(a) for lessons, i.e. phenomenon(a) meets the needs of and are relevant to learners, and have explanatory power
	• Students investigate through a confirmatory experience, rather than an exploratory experience	• Students begin to pose questions about the phenomenon	• Students pose and answer their questions about the phenomenon	• Students have choice in investigating their understanding of the phenomenon(a)
Engagement in Phenomenon	• Teacher does not provide phenomenon (a) to ground the learning	• Teachers introduce a phenomenon(a) or problem solution but do not return to student explanation of phenomenon	• Teachers introduce phenomenon(a) or problem solution as a unifying idea for the learning sequence	• Teacher purposefully engages students in the phenomena through questioning, initial models, etc. (SEPs), CCCs and or DCIs from prior knowledge/experience
	• Students engage in an activity with no connection to phenomenon(a)	• Students use phenomenon as an introduction but not as sense making	• Students begin the use the 3 dimensions (SEPs, DCIs, CCCs) to make sense of the phenomenon(a) or problem solution	• Students use the three dimensions to make sense of the presented phenomena and their relevance beyond a school setting

Evidence of learning	• Teachers provide little opportunity for metacognition • Student work is limited and reveals thinking only about the immediate learning experience	• Teachers provide opportunities for students to link their learning between experiences • Students reveal preliminary "ahas" as they link their learning	• Teachers provide opportunities for rich students to reflect on their prior knowledge and link it to their current understanding • Students demonstrate an understanding of phenomena, e.g. science notebook entry, diagram, science talk or other evidence of student thinking	• Teachers provide many opportunities for students to reveal their understanding of the phenomenon • Students make connections between phenomena and everyday life, i.e., students revise understanding and cite the rationale for new understanding.

NGSS Classroom Observation Tool
3-Dimensional Sensemaking

Components	NGSS Implementation: Novice	NGSS Implementation: Emerging	NGSS Implementation: Experienced	NGSS Implementation: Expert
Prior Knowledge	• Teacher does not access student prior knowledge • Students do not engage in what they know about phenomenon before they begin a learning sequence	• Teacher accesses student prior knowledge but does not modify instruction based on students' prior knowledge. • Students begin to refer to their prior knowledge as they make connections in their learning	• Teacher accesses student prior knowledge and modifies some instruction based on students' prior knowledge. • Students activate and use prior knowledge and experiences through written and oral activities to make predictions	• Teacher accesses student prior knowledge and appropriately modifies instruction based on students' prior knowledge. • Students document changes in their thinking from their prior knowledge to their current understanding
Constructing Meaning through the Science and Engineering Practices	• Teacher provides activities that are one dimensional e.g., DCIs	• Teacher begins to incorporate the SEPs in the learning experiences	• Teacher facilitates a learning sequence that features opportunities to build coherence, i.e., ask questions that connect ideas to ideas in the storyline or conceptual flow and move thinking forward consistent with the storyline • Teacher uses student responses and actions to adjust the learning sequence to meet the range of student conceptual	• Teacher designs a meaningful learning sequence that blends DCI(s), CCC(s) and SEPS(s) to facilitate student sensemaking of the phenomena • Teacher provides experiences that deepen student understanding • Teachers provide time for students to explore and modify their thinking

	• Students learn the "what" but not the "how" of science.	• Students make predictions or tentative explanations before exploring phenomenon(a) • Students collect, analyze and display data • Students ask questions about text before/during reading	understanding • Students plan investigations, collect and analyze data, develop and use conceptual models, connect their explanations to scientific principles and support their claims using evidence and reasoning	• Students construct, refine or edit explanations through additional experiences • Students make changes in their conceptual models as a result of new experiences and learning
Questioning	• Teacher uses rhetorical questions • Students do not ask questions	• Teacher asks low level questions • Teacher questions are uni-directional: teacher to student • Students provide answers but engage in little high level thinking (e.g., comparison, analysis, synthesis)	• Teacher encourages student reflection on sensemaking • Teacher encourages student-to-student discourse • Students reflect on sensemaking e.g., students compare initial understanding with new understanding. • Students try out their ideas in "public" (e.g. partners, small groups)	• Teacher prompts critical thinking through questions about the connections of the three dimensions to explain phenomenon • Teacher encourage students to challenge the thinking of others • Students use questions to challenge each other's thinking • Students develop and ask questions of the teacher and other students to modify their understanding of the three dimensions

Student Reflection (Meta-cognition)	• Teachers do not provide metacognitive prompts • Students do not reflect on their learning	• Teacher provides sentence starters for student reflections • Students reflect at a low level, e.g., recall level reflections	• Teachers enable students to metacognate in their own way of making sense • Students use multiple SEPs and CCCs to make sense of phenomena and document their understanding • Students reflect on sensemaking, i.e., students compare initial understanding with new understanding.	• Teachers provide processes and strategies for student metacognition of their learning of the three dimensions as related to explaining phenomenon • Students use schema, reflection and revision to describe, discuss and reflect on their understanding • Students apply learning to a new situation within or beyond the classroom

NGSS Classroom Observation Tool
Student-to-Student Discourse

Components	NGSS Implementation: Novice	NGSS Implementation: Emerging	NGSS Implementation: Experienced	NGSS Implementation: Expert
Norms for Discourse	• Teacher does not engage students in establishing norms for discourse and in using the norms • Students do not consistently apply the norms for discourse	• Teacher identifies classroom norms and solicits feedback from students • Students use norms but are not consistent in their use.	• Teacher and students co-develop classroom norms for discourse • Teacher supports classroom norms that encourage respectful and constructive discourse • Students use protocols/norms for discourse with little direction from teacher • Students encourage each other to use respectful and constructive discourse.	• Teacher monitors but does not direct elements of norms that support constructive discourse • Students identify elements of norms that support discourse and establish class norms • Students self-regulate and reinforce agreed upon classroom norms for discourse
Flow of Discourse	• Teacher inquires, and students respond • Teacher directs all communication through the teacher • Students respond to teacher directed inquires	• Teacher encourages students to initiate discourse by asking open ended questions • Students begin to initiate discourse, but much of the communication still flows through the teacher	• Teacher facilitates protocols that support students to initiate discourse • Students engage in communication that flows through teacher and students	• Teachers facilitates (as needed) students to initiate discourse to support sensemaking. • Students direct communication flows from student-to-student and teacher

• Questioning (same as questioning in 3-dimensional sensemaking rubric)	• Teacher uses rhetorical questions • Students do not ask questions	• Teacher asks low level questions • Teacher questions are one-dimensional: teacher to student • Students provide answers but engage in little high-level thinking (e.g., comparison, analysis, synthesis)	• Teacher encourages student reflection on sensemaking • Teacher encourages student-to-student discourse • Students reflect on sensemaking e., students compare initial understanding with new understanding. • Students try out their ideas in "public" (e.g. partners, small groups)	• Teacher prompts critical thinking through questions about the connections of the three dimensions to explain phenomenon • Teacher encourage students to challenge the thinking of others • Students use questions to challenge each other's thinking • Students develop and ask questions of the teacher and other students to modify their understanding of the three dimensions
• Diverse Opportunities for Discourse	• Teacher engages students in whole class discussions with a small number of students participating • Teacher focuses on procedural needs rather than student sensemaking	• Teacher begins using multiple groups (partners, small groups, whole groups) for discussion • Teacher begins to focus on student sensemaking • Teacher initiates whole group discussions with protocols to ensure equity of voice (e.g.,	• Teacher initiate discussion groups for discourse • Teacher focuses on discourse prompt/experiences for student sensemaking • Teacher intervenes frequently (e.g., provide scientific information, reinforce norms, redirect	• Teacher facilitates student choice in grouping for discourse • Teacher intervenes infrequently to reinforce student sensemaking • Teacher intervenes infrequently in terms of information, reinforcing norms or to ensure equity of

		equity sticks)	discourse, and to ensure equity of voice)	voice
	• Students rarely work in small groups	• Students work in small groups	• Students work in multiple group settings (partners, small groups, whole group)	• Students contribute to the structure for discourse, i.e., which grouping is most appropriate for sensemaking
	• Students do work that only requires low discourse demands	• Students provide responses from their work but do not engage in discourse with other group's responses	• Students are identified to lead parts of the discussion (e.g., expert groups) and engage in discourse with other groups	• Students facilitate small and large group discussions and engage in collaborative discussions