



## **Observation Rubric for Secondary Mathematics**

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## **ABSTRACT**

The teacher observation rubric for secondary mathematics was developed for observing pre-service teachers in UCLA's urban teacher residency program within the Teacher Education Program. The rubric focuses on four aspects of teaching - content rigor, student discourse, equitable student access to content, and classroom ecology - and includes examples of potential instructional strategies in each category.

TEACHING DIMENSIONS	CONTEMPLATING LEVEL 1	EMERGING/APPLYING LEVEL 2	INTEGRATING LEVEL 3	INNOVATING LEVEL 4	EXAMPLES OF INSTRUCTIONAL STRATEGIES
<b>INSTRUCTIONAL FOCUS OF MATHEMATICAL TASK</b>	There is no instructional focus or limited one-dimensional focus (e.g., solely on memorizing facts, rules, formulas, or definitions.)	Instructional focus is primarily one-dimensional with vague or little connection between mathematical concepts and different representations. Low level, primarily procedural/memorization of steps/facts that have little connection to understanding the mathematical concept. Focus on producing correct answer.	Instructional focus is clear and includes high-level tasks (doing mathematics, non-algorithmic thinking, procedures with connections) but focus is producing the right answer.	High level tasks that includes complexity, presses for generalizations across cases, strong connections between multiple strategies/representations, conjectures with evidence and explanations for conclusions.	<ul style="list-style-type: none"> <li>Pressing for accuracy (AL terminology)</li> <li>Prior knowledge</li> <li>Pressing for reasoning</li> <li>Getting students link ideas</li> </ul>
<b>IMPLEMENTATION OF THE TASK</b>	Teacher delivers inaccurate math OR Teacher teaches non-math content.	Teacher focuses primarily on the procedural knowledge of the problem regardless of the intentions of the original task OR Teacher does the complex thinking for the students.	Teacher engages some students in some complex thinking using high-level tasks, questions, strategies, and feedback.	Teacher engages students in the complex thinking using high-level tasks, questions, strategies, and feedback.	<ul style="list-style-type: none"> <li>Evaluating strategies</li> <li>Connecting ideas across methods/representations</li> <li>Point to key info</li> </ul>
<b>ENGAGING STUDENTS IN LEARNING</b>	Students have little or no opportunity to engage with content in ways likely to improve their understanding of mathematical concepts, procedures, and reasoning	Strategies for intellectual engagement offer opportunities for students to develop their own understanding of mathematical procedures.	Strategies for intellectual engagement offer structured opportunities for students to actively develop their own understanding of mathematical concepts, procedures, or reasoning.	Strategies for intellectual engagement offer structured opportunities for students to actively develop their own understanding of mathematical concepts, procedures, and reasoning.	<ul style="list-style-type: none"> <li>Think, Pair, Share</li> <li>Testing conjectures</li> <li>Practicing problems</li> <li>Poster presentations</li> </ul>
<b>CHECKING FOR UNDERSTANDING</b>	Teacher is not monitoring student progress in the lesson.	Teacher is monitoring student progress but does not use formative assessment to inform instruction	There are multiple opportunities using various strategies to monitor student progress throughout the lesson and attempts to use the information to make instructional decisions	There are multiple opportunities using various strategies to monitor student progress throughout the lesson and this information is used to make sound instructional decisions during the lesson to further students' mathematical understanding.	<ul style="list-style-type: none"> <li>Error analysis</li> <li>Consensus</li> <li>Justifications</li> <li>White boards/thumbs up</li> </ul>

MATHEMATICAL DISCOURSE

<b>TEACHER DISCOURSE: QUESTIONING</b>	Teacher asks no, or only non-math questions or provides no wait time or questions lead learners to misunderstandings	Asks yes/no, recalling of fact questions.	1-2 efforts to ask students to explain their thinking using reasoning and appropriate evidence	3 or more efforts to ask students to explain their thinking using reasoning and appropriate evidence.	<ul style="list-style-type: none"> <li>Predictions, conjectures, evidence/ rationale</li> <li>Wait time</li> <li>Evaluating strategies/ ideas</li> <li>Error analysis; counter examples, comparisons</li> <li>Follow-up questions, feedback</li> <li>Pair-share, dyad, group</li> <li>Panel, presentations,</li> <li>Whole-class discussion, seminar</li> <li>Re-voicing, summarizing, Modeling</li> <li>Consensus, proof</li> </ul>
<b>TEACHER DISCOURSE: LINKING IDEAS</b>	No linking in class discourse.	Teacher revoices or acknowledges student response.	Teacher revoices, acknowledges or questions student response to further the discussion 1-2 times.	Teacher revoices, acknowledges or questions student response to further the discussion 3 or more times.	
<b>STUDENT DISCOURSE: LINKING IDEAS</b>	No student linking in discourse	Students link their answers or ideas to others but do not use the connection to compare strategies, generate ideas or build upon knowledge.	Students link their answers or ideas to others 1-2 times in ways that compare strategies, generate ideas or build upon knowledge.	Students link their answers or ideas to others 3 or more times in ways that compare strategies, generate ideas or build upon knowledge.	
<b>STUDENT DISCOURSE: MATH RIGOR</b>	Non-math student talk OR Math ideas not generated by students (i.e. repeating what Teacher said or only asking questions.)	Student talk that only conveys procedural knowledge (i.e. definitions, procedures, rules and/or correctness of answer or providing an answer.)	Student talk that conveys procedural knowledge in relation to conceptual understanding or mathematical reasoning.	Student talk that conveys procedural knowledge in relation to conceptual understanding and mathematical reasoning.	
<b>STUDENT PARTICIPATION</b>	Zero, one or two students participate in the math discussion.	More than one or two but less than ¼ of students in class participate in discussion around the math topic.	About 1/2 of students in class participate in discussion around the math topic.	Majority of students in class participate in discussion around the math topic.	
<b>PARTICIPATION STRUCTURES</b>	No participation learning structures for student participation and/or discourse.	Participation learning structures with limited structure for equitable student participation -Some seating arrangements allow for discourse in pairs/small groups	Participation learning structures with some structure for equitable student participation. -Seating arrangements are in pairs/small groups -Some consideration for student needs.	Participation learning structures with structure for equitable student participation -Pair sharing -Small groups have individual roles and responsibilities. -Consideration for student needs.	

TEACHING DIMENSIONS	CONTEMPLATING LEVEL 1	EMERGING/APPLYING LEVEL 2	INTEGRATING LEVEL 3	INNOVATING LEVEL 4	EXAMPLES OF INSTRUCTIONAL STRATEGIES
<b>SUPPORTING DEVELOPMENT OF ACADEMIC LANGUAGE</b>	Little to no support of <i>learners'</i> language needs in instructional task. OR Content is oversimplified, limiting access to content	Teacher applies scaffolding and language development strategies to support the conceptual understanding of the learning task(s).	Level 2 plus Teacher provides explicit models and opportunities to practice, and feedback for <i>learners</i> to develop further language proficiency.	Level 3 plus Teacher differentiates language strategies to further develop language proficiency.	<ul style="list-style-type: none"> <li>• Accessing prior knowledge</li> <li>• Multi-tiered, multicultural, application tasks</li> <li>• Academic language strategies: word bank, association, sentence frames, etc.</li> <li>• Use of multiple learning modalities – productive &amp; receptive, visual, kinesthetic, auditory, etc.</li> <li>• SDAIE/sheltered strategies: group projects, choral reading, concept mapping, graphic organizers, prediction, quick write, quick draw, reflection, sentence starters/frames, verbalizing, vocabulary cards, etc.</li> <li>• Technology</li> <li>• Differentiated instruction through teacher input and student output.</li> </ul>
<b>SPECIALLY DESIGNED ACADEMIC INSTRUCTION IN ENGLISH (SDAIE) TO SUPPORT ENGLISH LANGUAGE LEARNERS (ELLS)</b>	Little to no evidence of SDAIE strategies used to support ELLs.	Some SDAIE strategies are evident.	Several SDAIE strategies are evident.	Several SDAIE strategies are used during instruction and 3 + SDAIE strategies are used as a form of formative assessment.	
<b>MAKING CONTENT RELEVANT FOR LEARNERS</b>	Limited to no evidence of connecting content to the real world (can include culturally relevant pedagogy or critical pedagogy).	Connection to the real world (can include culturally relevant pedagogy or critical pedagogy) is vague and not fully integrated into instructional focus.	Connection to the real world (can include culturally relevant pedagogy or critical pedagogy) is clear and integrated into the instructional focus and learning tasks.	Connection to the real world (can include culturally relevant pedagogy or critical pedagogy) and student lives is fully integrated into the learning tasks and instructional focus.	
<b>DIFFERENTIATION</b>	Little to no evidence of the use of diverse learning modalities to address student achievement needs.	Some evidence of the use of diverse learning modalities to address student achievement needs.	Evidence of diverse learning modalities that effectively address student learning and multi-tiered tasks (differentiated math tasks in relation to its level of difficulty), including tasks using multiple representations	Level 3 plus: Effective use of diverse learning modalities, learning tasks that include multi-levels and multiple representations that effectively address most or all students' achievement needs.	

**CLASSROOM ECOLOGY**

<b>CLASSROOM NORMS</b>	Few (1-2) to no observable classroom routines (class running, lesson running, interaction) exist causing student actions to interfere with learning.	Some (3-4) observable classroom routines exist (class running, lesson running, and interaction) that may or may not facilitate a positive learning environment.	Observable classroom routines exist (3-4) (class running, lesson running, and interaction) that facilitate a positive learning environment.	Observable routines (more than 4) (classroom running, lesson running, and interaction routines) exist that facilitate and maintain a positive, productive – optimal learning environment.	<ul style="list-style-type: none"> <li>• Instructional time is used wisely</li> <li>• Structure, transitions from activity to activity are planned</li> <li>• Classroom routines:                             <ol style="list-style-type: none"> <li>a) class-running routines,</li> <li>b) lesson-running routines,</li> <li>c) interaction routines planned</li> </ol> </li> <li>• Safety concerns are addressed appropriately</li> <li>• Teacher is professional in speech, dress, interactions with students, responsibilities to the profession</li> </ul>
<b>DEMOCRATIC CLASSROOM</b>	Teacher demonstrates little to no respect of student input.	A few voices are respected but teachers' response to student input does not often enhance learning and does not often promote healthy student-student-teacher relationship.	Some voices are respected but teachers' response to student input enhances learning and can promote healthy student-student-teacher relationship.	Most to all voices are respected. Negotiations and student input enhances learning and promotes healthy student-student-teacher relationship without undermining teacher knowledge and responsibility.	
<b>PROFESSIONALISM</b>	Little to no evidence of professionalism pertaining to the following: Planning, dress, academic language/professional talk, organization, timeliness.	Missing 2 or more: Planning, dress, academic language/professional talk, organization, timeliness.	Missing 1: Planning, dress, academic language/professional talk, organization, timeliness. <i>Planning to students</i>	Planning, dress, academic language/professional talk, organization, and timeliness all evident.	