

Name

Mid-Term Mathematics and Science Teaching Rubric (UTOP)

Description

The UTeach Observation Protocol (UTOP) for Mathematics and Science is an observational instrument that can be used to assess the overall quality of classroom instruction in math and science from kindergarten to the undergraduate level. The UTOP was designed to allow individuals to evaluate teaching effectiveness while valuing different modes of instruction.

Rubric Detail

Criteria	Levels of Achievement				
	1	2	3	4	5
1.1 Classroom Engagement: The classroom environment facilitated by the teacher encouraged students to generate ideas, questions, conjectures, and/or propositions that reflected engagement or exploration with important mathematics and science concepts.	1 Points This item should be rated a 1 if there were no examples of students attempting to or being encouraged by the teacher to generate their own ideas, questions, conjectures, or propositions, and no significant intellectual engagement was observed.	2 Points This item should be rated a 2 if there were only occasional examples of students generating nascent ideas and questions, these contributions were of low quality, and the teacher did not respond in a manner to draw out the students' thinking.	3 Points This item should be rated a 3 if there were several examples of students generating nascent ideas, conjectures, and questions of medium quality during the lesson, and the teacher was making moves to encourage these contributions. However, the teacher missed several opportunities to elicit and elaborate on students' thinking in an open discussion.	4 Points This item should be rated a 4 if students generated ideas and questions of medium to high quality during the lesson and the teacher regularly made attempts to elicit further student thinking and encouraged other students to contribute. The students also offered some of their own conjectures or propositions, and these offerings demonstrated clear engagement with the content. Perhaps there was a missed opportunity by the teacher that could have facilitated deeper student learning.	5 Points This item should be rated a 5 if students were highly engaged in the content and consistently offered high-quality ideas, questions, propositions, and conjectures. The teacher facilitated these contributions throughout the majority of the class period, allowing for deep and meaningful student learning opportunities.
1.2 Classroom Interactions: Interactions reflected collegial working relationships among students (e.g., students worked together productively and talked with each other about the lesson). *It's possible that this indicator was not applicable to the observed lesson. You may rate NA in this case.	1 Points This item should be rated a 1 if there was group work during the lesson, but the group work was highly unproductive. This could include behavior where the majority of the groups were socializing, off-task, arguing, or ignoring each other, as well as regular instances of students copying off their group members and/or certain group members doing all of the work.	2 Points This indicator should be rated a 2 if there was group work during the lesson, but some groups were unproductive, engaging in the off-task behaviors listed under the 1 rating. There could be occasional examples of productive group work for some groups but this was not consistent throughout the time allotted.	3 Points This indicator should be rated a 3 if there was group work during the lesson, and the groups were adequately productive throughout the group work time. There may be some examples of off-task conversation and group members not contributing.	4 Points This indicator should be rated a 4 if there was group work during the lesson and most of the groups worked together productively throughout this portion of the lesson. The groups were observed to discuss ideas and ask each other questions before seeking out the teacher, and the members themselves encouraged participation of all group members. There may still be an example of an unproductive group in the classroom, but the majority of students are working well together.	5 Points This indicator should be rated a 5 if there was group work during the lesson, and all groups worked together productively and were meaningfully engaged in the content and concepts of the lesson. All group members clearly understood and accepted their roles and were able to actively participate; groups discussed and explored ideas together, coming to a common understanding of the content and concepts.
1.3 Classroom On-Task: The majority of students were on task throughout the class.	1 Points This item should be rated a 1 if less than half (0–49%) of students were on task, on average, throughout the class period. Please weight appropriately if many students were on task for one portion of the lesson while few were on task for another	2 Points This item should be rated a 2 if at least half but less than three-quarters (50–74%) of students were on task, on average, throughout the class period. There were regular instances of off-task behavior that lasted for several minutes in this	3 Points This item should be rated a 3 if around three-quarters (75%) of students were on task, on average, throughout the class period. There were some instances off-task behavior that lasted for no more than a few minutes in this classroom.	4 Points This item should be rated a 4 if more than three-quarters (75–90%) of the students were on task, on average, throughout the class period. There were only occasional instances of off-task behavior in the classroom, and/or there were only a	5 Points This item should be rated a 5 if most or all (90–100%) of the students were on task and engaged throughout the lesson. There were rare or no instances of off-task behavior in this classroom.

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	1	2	3	4	5
	portion, to obtain an overall estimate of the percentage. For this rating, there must be consistent off-task behavior that affects the majority of the class.	classroom.		couple students who were not fully participating in the lesson on occasion.	
1.4 Classroom Management: The teacher's classroom management strategies enhanced the classroom environment.	1 Points This item should be rated a 1 if the classroom was very poorly managed, the students did not listen to the teacher, and/or the teacher made little or no attempt to manage their behavior. The lack of classroom management significantly disrupted all aspects of the class session, making it difficult for students to learn.	2 Points This item should be rated a 2 if the classroom was not well managed but was still functional—students were not overtly disruptive or creating distractions for others even though the teacher was not clearly "in charge." The lack of clear direction or classroom management occasionally disrupted the lesson, sometimes making it difficult for students to learn.	3 Points This item should be rated a 3 if the classroom was managed adequately; there were some disruptions that the teacher may or may not have dealt with appropriately, but overall learning by the majority of students was not negatively affected by management issues. The teacher may have made some management moves to enhance the classroom environment so that all students were able to engage and learn, but the impact was only minimally beneficial.	4 Points This item should be rated a 4 if the classroom was well managed—the teacher's management actions were clear, enhancing the classroom environment, and positively affecting students' opportunity to learn. There may have been minor or very occasional disruptive behavior that the teacher did not handle appropriately, but it did not negatively affect the whole class.	5 Points This item should be rated a 5 if the classroom was managed excellently and ran smoothly—the teacher's management actions and routines significantly enhanced students' learning of the content. Classroom expectations, instructions, and routines were clear to all students at all times.
1.5 Classroom Organization: The classroom is organized appropriately such that students can work in groups easily and get to lab materials as needed, and the teacher can move to each student or student group.	1 Points This item should be rated with a 1 if there were one or more major classroom setup or organizational issues that significantly disrupted the ability of students to focus on and learn the content of the lesson. This may be something that was not under the teacher's control but still should be recorded with this instrument.	2 Points This item should be rated with a 2 if there were several minor classroom setup or organization issues that caused a few small disruptions to the lesson, and some students' ability to fully participate was affected negatively.	3 Points This item should be rated a 3 if there were no classroom setup or organizational issues that disrupted or distracted the majority (50–75%) of students from participating in the activities of the lesson—the classroom was appropriately arranged for the lesson.	4 Points This item should be rated a 4 if the classroom was well-organized and the teacher's actions relating to the setup of the classroom enhanced most (75–90%) students' interaction with materials or each other as required for the activity. There may be a small missed opportunity where a few students were affected in their ability to participate for a short period of time.	5 Points This item should be rated a 5 if the organization of the classroom was excellent and the setup for the lesson clearly and positively enhanced each student's learning and created opportunity for engagement and full participation. There was specific evidence that the teacher made moves to ensure this, and there were no instances of students' being affected negatively by the setup of the classroom.
1.6 Classroom Equity: The classroom environment established by the teacher reflected attention to issues of access, equity, and diversity for students (e.g., cooperative learning, language-appropriate strategies and materials, attentiveness to student needs).	1 Points This item should be rated a 1 if the rater noted a major issue relating to equity, access, or diversity that significantly negatively impacted the classroom environment and all students' opportunities to learn.	2 Points This item should be rated a 2 if the rater noted one or two minor issues relating to equity, access, and diversity that may have had a small negative impact on students' opportunities to learn. The teacher may have attempted some positive modifications to take into account issues of equity, access, and diversity, but ultimately these modifications were	3 Points This item should be rated a 2 if the rater noted one or two minor issues relating to equity, access, and diversity that may have had a small negative impact on students' opportunities to learn. The teacher may have attempted some positive modifications to take into account issues of equity, access, and diversity, but ultimately these modifications were	4 Points This item should be rated a 4 if there was no evidence of actions the teacher took relating to equity, access, and diversity that negatively impacted the classroom environment, and, overall, the teacher's actions relating to this indicator had a positive impact on the classroom environment. There may have been a small missed opportunity to	5 Points This item should be rated as a 5 if there is evidence that the teacher explicitly took into account issues of equity, access, and diversity in the classroom throughout the lesson so that all students were equitably engaged, had easy access to lesson content and materials, and were treated with respect by all throughout the class session. In other words, the classroom

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		not successful.	not successful.	provide equitable access to the content or recognize and adapt for a students' individual needs.	environment clearly reflected thorough attention to equity, access, and diversity of all students.
2.1 Lesson Sequence: The lesson was well organized and structured (e.g., the objectives of the lesson were clear to students, and the sequence of the lesson was structured to build understanding and maintain a sense of purpose).	1 Points This item should be rated a 1 if the lesson was structured such that there was little or no productive, learning-focused interaction between teacher and students, and/or the content objectives of the lesson were unclear or inappropriate to the developmental level of the students, and/or the sequence of the lesson was disorganized, and/or there was a major problem with the organization or framing of the lesson that significantly and negatively impacted student learning during the majority (75–100%) of the class period.	2 Points This item should be rated a 2 if the lesson was only occasionally structured to engage students in learning-focused activities and/or the purpose/objectives were not communicated clearly, and/or there were some problems with the organization of the lesson that negatively impacted student learning during approximately 50% of the time allotted for the lesson.	3 Points This item should be rated a 3 if the lesson's structure and organization were adequate for the majority of time allotted (50–75%). The lesson may not have been structured perfectly, and there may have been a part of the lesson that was disorganized or confusing to the students, but the lesson sequence generally kept students engaged and moving from one portion to the next in a reasonable manner, and students generally seemed to understand the purpose of the lesson and what they were to do to accomplish this purpose.	4 Points This item should be rated a 4 if the lesson was well structured and well organized. A well-structured lesson would be a developmentally appropriate, well-designed sequence of learning activities that kept students engaged in the content and had a clear sense of purpose throughout the vast majority of the class time (75–90%). However, there may have been a minor missed opportunity or minor organizational issue present during the lesson that wasted student time for learning.	5 Points This item should be rated a 5 if the structure and organization of the lesson was excellent. The lesson was structured to take into account or build prior knowledge of the topic and was well paced with a thoughtfully chosen sequence of learning activities, and the teacher had anticipated the pedagogical approaches that would be most effective in engaging the students throughout the entire class period.
2.2 Lesson Importance: The structure of the lesson allowed students to engage with and/or explore important concepts in mathematics or science (instead of focusing on techniques that may only be useful on exams).	1 Points This item should be rated a 1 if the structure of the lesson did not allow students to either engage with or explore concepts in mathematics or science.	2 Points This item should be rated a 2 if the structure of the lesson occasionally or sporadically (only 20–30% of the time) allowed for student engagement in mathematics or science concepts.	3 Points This item should be rated a 3 if the structure of the lesson allowed students to engage with and/or explore the mathematics or science content, but these opportunities were only in place during the lesson approximately 50% of the time.	4 Points This item should be rated a 4 if the structure of the lesson allowed students to engage with and/or explore mathematics or science concepts for most of the class period (80–90% of the time). There may have been a minor missed opportunity or small portion of the lesson that was not designed to be as engaging.	5 Points This item should be rated a 5 if during most (greater than 90%) of the class period, the structure of the lesson allowed students to engage with and explore important mathematics or science concepts. This was a continuous and explicit focus of the teacher's plan, and the structure and sequence were clearly designed to ensure that students remained engaged throughout the entire class period.
2.3 Lesson Assessments: The structure of the lesson included opportunities for the instructor to gauge student understanding.	1 Points This item should be rated a 1 if there was little or no time structured into the lesson to assess student understanding—the teacher led the entire lesson with no or little student input regarding their thinking about key mathematics or science concepts.	2 Points This item should be rated a 2 if there were only occasional or sporadic places in the lesson where there was an opportunity for the teacher to assess or observe what students were thinking, talking about, or doing—perhaps the teacher planned time to elicit a couple of quality student contributions	3 Points This item should be rated a 3 if there were some opportunities clearly designed for in the lesson structure to allow the teacher to gauge student understanding, and there was evidence that the teacher purposefully created appropriate structures or methods for students to express	4 Points This item should be rated a 4 if there were regular or frequent opportunities for the teacher to gauge student understanding, based on the way the teacher had structured the lesson. The teacher had planned for a number and variety of methods and opportunities for	5 Points This item should be rated a 5 if the lesson was structured as clearly student-centered—students were consistently and constantly trying out ideas and expressing their understanding of key mathematics and science concepts throughout the majority of the lesson. The teacher planned the lesson so that students

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		or did some assessment of a few students thinking based on their written work occasionally during the class period.	their thinking. However, there may have been a few minor missed opportunities to check in with some students and/or groups.	students to explore, propose, share, and refine their thinking.	spent the entire class period exploring, proposing ideas, sharing, and refining their thinking.
2.4 Lesson Investigation: The lesson included an investigative or problem-based approach to important concepts in mathematics or science.	1 Points This item should be rated a 1 if there were no elements of investigation or problem-based learning in the lesson.	2 Points This item should be rated a 2 if there was only a minor example of investigative or problem-based learning in the lesson, and it was not a focus of the lesson.	3 Points This item should be rated a 3 if elements of investigative and/or problem-based learning were designed to occur with moderate frequency, and/or if the problem-based or investigative activities were of moderate quality.	4 Points This item should be rated a 4 if the majority of the lesson design employed an investigative or problem-based approach and the activities planned were of medium to good quality. However, there may be a small missed opportunity on the part of the teacher to incorporate more aspects of investigation or problem-based learning into the lesson.	5 Points This item should be rated a 5 if the lesson was clearly designed with an investigation and problem-based approach, and the learning activities chosen were of high quality.
2.5 Lesson Resources: The teacher obtained and employed resources appropriate for the lesson.	1 Points This item should be rated a 1 if one or more of the resources chosen for the lesson was highly inappropriate or negatively impacted student opportunity to learn.	2 Points This item should be rated a 2 if one or more of the resources chosen for the lesson occasionally negatively impacted student opportunity to learn, and/or if there were clearly more appropriate and effective resources that could have been chosen.	3 Points This item should be rated a 3 if the resources were adequate for the purposes of instruction. None of the resources disrupted student learning, but none of the resources noticeably enhanced learning through their use and implementation.	4 Points This item should be rated a 4 if there was evidence that the specific resources selected by the teacher were appropriate and enhanced student learning. There may have been a small missed opportunity or minor problem with resource use or there may have been a small instance of limited access to the resources appropriate for each stage of the lesson.	5 Points This item should be rated a 5 if there was significant evidence that the teacher had carefully selected resources to enhance student learning and that these resources were effective, accessible, and appropriate for this purpose.
2.6 Lesson Reflection: The teacher was critical and reflective about his/her practice after the lesson, recognizing the strengths and weaknesses of his/her instruction.* This indicator may be rated NA if you do not have access to a teacher interview or teacher commentary.	1 Points This item should be rated a 1 if the teacher did not discuss or recognize any strengths or weaknesses of instruction.	2 Points This item should be rated a 2 if the teacher identified strengths and weaknesses that were unimportant, and/or that were only related to tangential or insignificant procedural elements of the lesson. These strengths and weaknesses were unrelated to what is assessed on the UTOP.	3 Points This item should be rated a 3 if the teacher discussed and recognized one or two important strengths of instruction captured by the UTOP, but perhaps did not acknowledge or recognize any of the major weaknesses.	4 Points This item should be rated a 4 if the teacher recognized a fair portion (but not all) of the strengths and weaknesses the rater identified.	5 Points This item should be rated a 5 if the teacher recognized many of the strengths and weaknesses of the lesson that the rater recognized while evaluating the lesson with the UTOP. This item should also be rated a 5 if the teacher recognized the most important strengths and weaknesses of the lesson.
3.1 Implementation Questioning: The teacher used questioning strategies to encourage participation, check on skill development, and facilitate intellectual engagement and	1 Points This item should be rated a 1 if the teacher used little or no appropriate questioning strategies that engaged students	2 Points This item should be rated a 2 if the teacher occasionally or sporadically questioned a few students to refocus attention, encourage	3 Points This item should be rated a 3 if the teacher regularly used questioning techniques to encourage and maintain participation	4 Points This item should be rated a 4 if the teacher frequently used questioning techniques to encourage and maintain participation	5 Points This item should be rated a 5 if the teacher consistently and continually used multi-level questioning strategies to

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productive interaction with students about important science and mathematics content and concepts.	with important science or mathematics content or concepts at any level during the lesson.	participation, or check on skill development, but there were no instances of questions that challenged students to think critically about important science content or concepts.	and to check on skill development and progress with the lesson activity during some portions of the lesson, especially the introduction and wrap up. The teacher asked appropriate procedural and factual questions about important science or mathematics content or concepts but rarely challenged student thinking with question probes for deeper understandings or misconceptions.	and develop skills throughout the class period. Some questions were asked that probed student thinking about important science content or concepts, uncovering alternative or misconceptions that were then appropriately used by the teacher to get students to reflect and expand further on this content or concepts.	encourage and maintain participation and to check on skill development and students' progress with the lesson activity throughout the class period. In addition, the majority of questions asked probed students' thinking about important science content or concepts deeply, challenging preconceptions and assumptions and pushing students to develop new knowledge or novel applications.
3.2 Implementation Involvement: The teacher involved all students in the lesson (calling on non-volunteers, facilitating student-student interaction, checking in with hesitant learners, etc.).	1 Points This item should be rated a 1 if the teacher did not attempt to involve all students in the lesson. This means the teacher only called on volunteers during whole-class portions of the lesson, and only checked in with groups who specifically requested help during group-work portions of the lesson.	2 Points This item should be rated a 2 if the teacher occasionally or sporadically made an attempt to involve all students in the lesson. Perhaps the teacher occasionally called on non-volunteers, or only checked in with some groups not requesting help when she had responded to all other student requests for assistance.	3 Points This item should be rated a 3 if the teacher made moves to involve all students in the lesson but ultimately did not do enough such that all students were able to participate. This item should also be rated a 3 if the teacher is not seen making any specific moves to involve all students in the lesson, but all students seem to be involved anyway. The teacher may have made moves previously (throughout the school year) to set up and ensure a classroom culture where all students actively participate.	4 Points This item should be rated a 4 if the teacher made clear attempts to involve a wide variety of students in the lesson and was actively working to ensure the participation of all students. Occasionally, the teacher may have missed an opportunity to maintain participation with struggling students who stopped working, or the teacher may not have appropriately challenged uninvolved students who finished early during some portion of the lesson.	5 Points This item should be rated a 5 if, throughout the lesson, the teacher was actively and consistently working to involve, challenge, and maintain intellectual engagement and participation in the lesson activities with every student, including shy students, hesitant learners, bored/disruptive students, struggling students, and students with special needs.
3.3 Implementation Modification: The teacher used formative assessment effectively to be aware of the progress of all students and modified the lesson appropriately when formative assessment demonstrated that students did not understand.	1 Points This item should be rated a 1 if the teacher did not attempt to formatively assess student understanding during the lesson. This item should also be rated a 1 if it was clear that modifications to the lesson were needed to support student understanding, but the teacher did not make modifications.	2 Points This item should be rated a 2 if the teacher made only occasional or sporadic attempts to formatively assess student understanding.	3 Points This item should be rated a 3 if the teacher made regular attempts at formative assessment, but some of these attempts were of poor quality and the teacher missed opportunities to fully elicit student understanding. The teacher should have made some modifications to the lesson based on formative assessment of student understanding, and these modifications may have been somewhat successful. This item should also be rated a 3 if the teacher made no modifications to the lesson, but the	4 Points This item should be rated a 4 if the teacher consistently used formative assessments to monitor student progress during the lesson, and these assessments were of sufficient quantity to allow the teacher to obtain a clear picture of student understanding. The teacher also adjusted the lesson based on formative assessment as appropriate throughout the class period. There may have been a small missed opportunity to modify the lesson or a modification that was not completely successful.	5 Points This item should be rated a 5 if the teacher consistently used high-quality formative assessment throughout the class period to monitor student understanding and was able to modify his or her teaching or carefully target instruction based on the results of this assessment. The teacher successfully and consistently adjusted the lesson based on formative assessment of student understanding as appropriate throughout the class period.

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	1	2	3	4	5
			teacher's formative assessments suggested that no modifications were needed.		
3.4 Implementation Timing: An appropriate amount of time was devoted to each part of the lesson.	1 Points This item should be rated a 1 if there was a significant amount of wasted time during the class period where students were unengaged or off task, or if there was another major timing issue that disrupted student learning.	2 Points This item should be rated a 2 if there were several instances of wasted time during the class period where students were off task, and/or if an appropriate amount of time was not devoted to key portions of the lesson, leading to confusion or frustration on the part of the students.	3 Points This item should be rated a 3 if there were no major timing issues or wasted time during the lesson, but perhaps an appropriate amount of time was not devoted to more important parts of the lesson, like the time allotted for student lab work was not sufficient, or the wrap up portion of the lesson was missing. A few students disengaged early or were left trying to finish when the bell rang.	4 Points This item should be rated a 4 if sufficient amounts of time were devoted to the most important portions of the lesson and appropriate amounts of time for introduction, instructions, and wrap up were evidenced because most of the students were engaged and productively on-task throughout the lesson. There may have been one instance of wasted time, or one portion of the lesson might have been slightly more rushed or allotted more time than it should have been, but the overall flow and timing allowed most students to accomplish the work of the lesson activity.	5 Points This item should be rated a 5 if the appropriate amount of time was devoted to all portions of the lesson, including introduction, instructions, and wrap up. All students were productively on-task, as there were no instances of wasted time during this lesson, and all parts of the lesson proceeded at an appropriate pace.
3.5 Implementation Connections: The instructional strategies and activities used in this lesson clearly connected to students' prior knowledge and experience.	1 Points This item should be rated a 1 if there was no evidence of the teacher making any attempt at connecting instruction to students' prior knowledge and experiences.	2 Points This item should be rated a 2 if the teacher made a small or passing reference to a previously learned mathematics/science concept and/or students' everyday experiences with science or mathematics.	3 Points This item should be rated a 2 if the teacher made a small or passing reference to a previously learned mathematics/science concept and/or students' everyday experiences with science or mathematics.	4 Points This item should be rated a 4 if the teacher made several attempts throughout the class period to draw upon students' prior knowledge of previously learned mathematics/science concepts and students' everyday experiences with science or mathematics, getting input from a majority of students in the class.	5 Points This item should be rated a 5 if the lesson is built purposefully and explicitly from the perspective of the students' prior knowledge of the concepts being covered. This included both their prior school knowledge of related mathematics or science concepts, and their prior knowledge of using or experiencing the concepts in everyday life. In addition, the teacher made a significant effort to get input from all students related to their experiences and prior knowledge with the mathematics and science content and concepts explored in the lesson. This item should also be rated a 5 if the teacher engaged the class in an extended discussion relating to their prior knowledge and experience, making it a focus of instruction.

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<p>3.6 Implementation Safety: The teacher's instructional strategies included safe, environmentally appropriate, and ethical implementation of laboratory procedures and/or classroom activities.*This indicator may be rated NA if there were no relevant activities during the lesson.</p>	<p>1 Points</p> <p>This item should be rated a 1 if there was evidence of any significant safety violation or inappropriate behavior that endangered or resulted in unethical treatment of the students or teacher in the classroom, and the teacher did not handle this situation appropriately. The teacher did not monitor or correct safety violations or unethical behavior.</p>	<p>2 Points</p> <p>This item should be rated a 2 if there were several minor instances of a safety violation or ethically inappropriate behavior that were not quickly and successfully corrected by the teacher.</p>	<p>3 Points</p> <p>This item should be rated a 3 if there were some minor instances of a safety violation or ethically inappropriate behavior, most of which were quickly and successfully corrected by the teacher. A few instances of safety violations or ethically inappropriate behavior may have been ignored or gone unseen by the teacher.</p>	<p>4 Points</p> <p>This item should be rated a 4 if there were very few instances of ethical/safety neglect, because the teacher had clearly established classroom safety/ethical practices and consistently monitored the classroom, enforcing these policies.</p>	<p>5 Points</p> <p>This item should be rated a 5 if there were no instances of safety violations or ethically inappropriate behaviors because the teacher had clearly established practices and consistently monitored the classroom, explicitly reminding students of why these policies are necessary and modeling safe/ethical practices (i.e., wearing safety goggles at all times in the lab setting).</p>
<p>4.1 Content Significance: The mathematics or science content chosen was significant, worthwhile, and developmentally appropriate for this course (includes the content standards covered, as well as examples and activities chosen by the teacher).</p>	<p>1 Points</p> <p>This item should be rated a 1 if the content covered and/or tasks, examples, or activities chosen by the teacher were unrelated to the science or mathematics content of the course.</p>	<p>2 Points</p> <p>This item should be rated a 2 if the content covered and/or tasks, examples, or activities chosen by the teacher were distantly or only sometimes related to the science or mathematics content of the course. This item should also be rated a 2 if the content chosen was developmentally inappropriate—either too low-level or too advanced for the students.</p>	<p>3 Points</p> <p>This item should be rated a 3 if the content covered was significant and relevant to the science or mathematics content of the course, but the presentation, tasks, examples, or activities chosen were prescriptive, superficial, or contrived and did not allow the students to make meaningful connections to mathematical or scientific ideas. This item should also be rated a 3 if the content covered was focused toward general standardized test preparation in mathematics or science for the grade level rather than the specific content objectives of the course.</p>	<p>4 Points</p> <p>This item should be rated a 4 if the content covered and/or tasks, examples, or activities chosen by the teacher were clearly related to the significant science or mathematics content of the course, and the tasks, examples, or activities that were used allowed for some student development of worthwhile connections to the mathematical or scientific ideas.</p>	<p>5 Points</p> <p>This item should be rated a 5 if the content covered and/or tasks, examples, or activities chosen by the teacher were clearly and explicitly related to significant science and mathematics concepts in ways that allowed students to gain a deeper understanding and make worthwhile connections to the mathematical or scientific ideas.</p>
<p>4.2 Content Fluency: Content communicated through direct and non-direct instruction by the teacher is consistent with deep knowledge and fluency with the mathematics or science concepts of the lesson (e.g., fluent use of examples, discussions, and explanations of concepts, etc.).</p>	<p>1 Points</p> <p>This item should be rated a 1 if there was a significant issue with the teacher's understanding and/or communication of the content that negatively impacted student learning during the class period.</p>	<p>2 Points</p> <p>This item should be rated a 2 if there were several smaller issues with the teacher's understanding and/or communication of the content that sometimes had a negative impact on student learning.</p>	<p>3 Points</p> <p>This item should be rated a 3 if there were no issues with the teacher's understanding of the content and its accuracy, but the teacher was not always fluid or did not try to present the content in multiple ways. When students appeared confused, the teacher was unable to reteach the content in a completely clear, understandable, and/or transparent way such that most students understood.</p>	<p>4 Points</p> <p>This item should be rated a 4 if the teacher clearly understood the content and how to successfully communicate the content to most students in the class. The teacher used multiple examples and strategies to engage students with the content. The teacher's depth of content knowledge enhanced student learning.</p>	<p>5 Points</p> <p>This item should be rated a 5 if the teacher clearly understood the content and how to successfully communicate the content to all students in the class. The teacher was able to present interesting and relevant examples, explain concepts in multiple ways, facilitate discussions, connect the content to the big ideas of the discipline, use advanced questioning strategies to guide student learning, and identify and use common</p>

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					misconceptions or alternative ideas as learning tools. The teacher's depth of content knowledge greatly enhanced student learning.
4.3 Content Accuracy: Teacher written and verbal content information was accurate.	1 Points This item should be rated a 1 if there was a major instance of incorrect written or verbal content information communicated by the teacher that was not corrected, and this mistake had a large negative impact on student learning.	2 Points This item should be rated a 2 if there was a major instance of incorrect written or verbal content information that the teacher caught and corrected, or if there were a number of minor written or verbal content mistakes, inconsistencies, and/or ambiguities that negatively impacted learning.	3 Points This item should be rated a 3 if there were minor written or verbal content issues, and the teacher did not correct or catch all of them.	4 Points This item should be rated a 4 if there were only minor content mistakes or ambiguities that were corrected by the teacher.	5 Points This item should be rated a 5 if there were no examples of incorrect or ambiguous written or verbal content information communicated by the teacher during the class period.
4.4 Content Assessments: Formal assessments used by teacher (if available) were consistent with content objectives (homework, lab sheets, tests, quizzes, etc.). ^a It's possible that this indicator was not applicable to the observed lesson. You may rate NA in this case.	1 Points This item should be rated a 1 if there was a formal assessment during the lesson, but this formal assessment was highly inappropriate and not matched with the content objectives.	2 Points This item should be rated a 2 if there was a formal assessment during the lesson, but the assessment was poorly designed or not entirely consistent with content objectives.	3 Points This item should be rated a 3 if there was a formal assessment during the lesson, and this formal assessment was generally appropriate and matched with content objectives.	4 Points This item should be rated a 4 if there was a formal assessment during the lesson, and this formal assessment was well designed to evaluate student understanding of important mathematical and scientific concepts that had been central components of instruction in the classroom.	5 Points This item should be rated a 5 if there was a formal assessment during the lesson, and this formal assessment was well designed to evaluate student understanding of important mathematical and scientific concepts that had been central components of instruction in the classroom. The assessment was also designed to push students' thinking to the next level and provide opportunities for challenge and additional learning.
4.5 Content Abstraction: Elements of mathematical/scientific abstraction were used appropriately (e.g., multiple forms of representation in science and mathematics classes include verbal, graphic, symbolic, visualizations, simulations, models of systems and structures that are not directly observable in real time or by the naked eye, etc.). ^a It's possible that this indicator was not applicable to the observed lesson. You may rate NA in this case.	1 Points This item should be rated a 1 if there was a major issue with the teacher's use of abstraction that had a negative impact on student learning during the class period.	2 Points This item should be rated a 2 if the teacher neglected important explanation and discussion of abstraction that was being used during the class period, and this missed opportunity had a negative impact on student learning.	3 Points This item should be rated a 3 if the teacher's use of abstraction was adequate—the teacher allowed for some discussion or explanation and did not use abstraction inappropriately.	4 Points This item should be rated a 4 if abstraction was used during the class period for a relevant and useful purpose. The teacher explicitly engaged students in some discussion of the meaning of the representation and/or successfully connected different representational forms. Perhaps there was a small missed opportunity with respect to facilitating some students' understanding of abstraction.	5 Points This item should be rated a 5 if abstraction was being used for a relevant and useful purpose, like modeling, supporting an argument for a scientific theory or mathematical proof, or progressively generalizing important ideas, AND if the teacher engaged students in a discussion of the meaning and purpose of the representation. The abstractions were presented in a way such that they were understandable and accessible to all students in the class.
4.6 Content Relevance: During the lesson, it was made	1 Points This item should be	2 Points This item should be	3 Points This item should be	4 Points This item should be	5 Points This item should be

Criteria	Levels of Achievement				
	1	2	3	4	5
explicit to students why the content is important to learn.	rated a 1 if there were no instances of it being made explicit to students why the content is important to learn.	rated a 2 if the teacher made only a brief reference to the importance of the content, and there was no elaboration or discussion. This item should also be rated a 2 if the teacher did not explicitly discuss content significance, but the significance was clearly implicit or obvious in the work students were doing.	rated a 3 if the teacher made some moves to tie in the significance of the content during the class period, perhaps mentioning it more than one time.	rated a 4 if the teacher engaged students in a discussion of why the content was important to learn.	rated a 5 if the importance of the content was a central theme that was discussed and expanded upon throughout the class period.
4.7 Content Interconnections: Appropriate connections were made to other areas of mathematics or science and/or to other disciplines.	1 Points This item should be rated a 1 if no connections were made to other areas of mathematics/science or other academic disciplines, or if connections were made that were inappropriate or incorrect.	2 Points This item should be rated a 2 if a minor connection was made to another area of mathematics/science or other academic disciplines, but the teacher did not explicitly discuss this connection with the class.	3 Points This item should be rated a 3 if the teacher connected the content being learned to another area of mathematics/science or other academic disciplines, and if the teacher explicitly brought this connection to students' attention.	4 Points This item should be rated a 4 if the teacher included one or more connections between the content and other areas of mathematics/science or other academic disciplines, or problems that professionals actually encounter, AND the teacher engaged the students in an extended discussion or activity relating to these connections.	5 Points This item should be rated a 5 if, throughout the class period, the content was taught in the context of its use in other academic disciplines, other areas of mathematics/science, or in the work of professionals, AND the teacher clearly demonstrated deep knowledge about how the content is used in those areas.
4.8 Content Societal Impact: During the lesson, there was discussion about the content topic's role in history, current events, or relevant "real-world" problems.	1 Points This item should be rated a 1 if there was no discussion about the content topic's role in history, current events, or relevant real-world problems during the class period, or if there was a discussion, but it was inappropriate or incorrect.	2 Points This item should be rated a 2 if a connection was made to history, current events, or relevant real-world problems that the teacher did not specifically mention or call attention to (i.e., it was written on a worksheet), or if the teacher made a general and brief comment about a possible connection to history or current events that was not expanded upon.	3 Points This item should be rated a 3 if the teacher explicitly called attention to how the content was specifically connected to history, current events, or relevant real-world problems but did not fully expand upon this idea with the class that led to student learning.	4 Points This item should be rated a 4 if the teacher explicitly called attention to how the content was connected to history, current events, or relevant real-world problems and engaged the class in an extended discussion of this connection.	5 Points This item should be rated a 5 if, throughout the class period, the students were doing activities and/or having discussions related to the content topic's role in history, current events, or relevant real-world problems and if the teacher clearly demonstrated deep knowledge about how this topic was connected to history or current events or in the solution of real-world problems.

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