UTeach Observation Protocol (UTOP) Sample Scoring: Grades 10–11 Math/Science, Project-Based Learning Video 1 (Day 1)[1]

Complete **AFTER** observation of lesson, using field notes, teacher post-interview, and student work samples and/or comments (plus video if available).

Note: An observer scored this sample based on a classroom observed at Manor New Tech High School in Manor, Texas. The project observed in this classroom was a multi-day project. The video, sample scores, and more for this and other days of the project are available on the UTOP website: http://utop.uteach.utexas.edu/?q=sample-utop-scoring.

I. BACKGROUND INFORMATION

Teacher: NA
School: Manor New Tech High School
Date of Observation: NA
Start and End Time of Observation: NA
Date of Post Interview: NA
Method of Post-Interview: Face-to-face
Subject Observed: Phylgebrics (Physics I and Algebra II combined class)
Grade Level: 10 and 11
Course Level: (Regular or Advanced/Accelerated): Regular
Observer: UTOP Expert

II. LESSON OVERVIEW

In a paragraph or two, describe the lesson you observed. Include where the lesson fits into the overall unit of study. Be sure to include enough detail to provide a context for your ratings of the lesson and also to allow you to recall the details of the lesson when needed in the future.

> This lesson took place on the first day of a three-week project-based unit. The class began with the teacher introducing the My Li'l Galaxy project, in which the students would design a solar system that included at least one planet that could sustain life. The project was introduced with an entry video designed to engage students in the upcoming project and provide a context for the math and science concepts they would explore and apply throughout the duration of the project. Students were instructed to write individually in their journals, defining what challenges the project presented and what they need to do in order to accomplish the assignment and address these challenges.

---

[1] NOTE: The UTOP was adapted from Horizon Research, Inc., *2005–06 Core Evaluation Manual: Classroom Observation Protocol* by UTeach Natural Sciences, University of Texas at Austin.

This document is an example of an instrument that an observer has filled in after observing one period of a grades 10–11 math/science classroom. For more information about the UTOP, see http://utop.uteach.utexas.edu.

After watching the entry video, students worked in groups and compiled their individual journal assignments into a single online journal submission. The teacher assigned Interactive Journals to organize students' note taking and assignments. An Interactive Journal is a written journal in which each student has the same assignment. For example, on page 23, every student should have completed the warm-up from a particular day or the notes from an activity. In project-based learning, it is helpful to have this structure in place so that students can organize the development of their understanding of the content standards upon which the unit is based. For example, on this day, using their notes from their Interactive Journals, students were required to complete a short assessment of their understanding of conic sections based on an activity they had completed the prior class session.

In the second half of class, the teacher had created stations around the room where students' work from a previous activity was displayed. This work was the result of several groups' brainstorming sessions about what essential characteristics of a planet were required to sustain life. On this day, groups moved around to each station, viewing and discussing the ideas presented. After discussion about what they viewed at each station, the students used a graphic organizer to list four essential and four non-essential characteristics of a planet that could support life.

The class ended with students reading a published scientific review article that described essential characteristics for life. Finally, the students were instructed to write a response to this reading, comparing the characteristics defined in the article to their own groups' ideas.

III. RATING SCALES

1 = Not observed at all / Not demonstrated at all	4 = Observed often / Demonstrated well
2 = Observed rarely / Demonstrated poorly	5 = Observed to a great extent / Demonstrated to a great extent
3 = Observed an adequate amount / Demonstrated adequately	

1. Classroom Environment

Rating	Indicator
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. Description, Rubric, and Examples

Evidence

Student groups observed and asked questions of one another throughout the lesson. Each student in the group shared their insights about how the group should approach the assignment. While discussing "Do you think it's necessary to have different types of seasons?" [20:33–21:57], one student states that she "likes seasons," but another group member says that she doesn't think seasons are necessary to sustain life. This student goes on to provide her rationale by explaining that some places on Earth don't have seasons and that

different types of plants can live in different temperatures (climates). Another group member confirms that she has lived in Texas for 16 years, where "there isn't really seasons" and she is still alive. They continue to ask each other questions that challenge each other's ideas and, as a group, generate conjectures in order to move forward in the development of criteria for the conditions of life on the planet they will create in the "habitable zone." They ask a teacher, "Do you agree that we don't need to have different seasons?" The teacher explains that she once lived in the northeast, where there were four seasons, and she now lives in Texas, where her quality of life related to seasons has neither increased or decreased. It was apparent that students were comfortable asking questions and sharing ideas in their groups and with their teachers.

Rating	Indicator
5	**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.* Description, Rubric, and Examples

Evidence

Students in the groups observed worked together in a collegial manner [05:30–06:23]. At the beginning of group work time, the students held a brief discussion about the amount of time it would take to complete the warm-up and the sequence of tasks thereafter. One of the students stated to her group mates that she did not understand why they picked a planet on Friday. Her group member explained that she thought the purpose of Friday's activity was to begin thinking about creating a planet to sustain life [08:26–09:13]. Students were working collaboratively in groups; for example, during a group discussion, one member was observed summarizing responses and typing up the groups' ideas for submission to the teacher. Each group member seemed comfortable providing their understanding and experiences with the group, and they completed a report by consensus.

Rating	Indicator
5	**1.3 Classroom On-Task:** The majority of students were on task throughout the class. Description, Rubric, and Examples

Evidence

All students observed in this video segment were on task more than 90% of the time.

Rating	Indicator
5	**1.4 Classroom Management:** The teacher's classroom management strategies enhanced the classroom environment. Description, Rubric, and Examples

Evidence

The teachers provided instructions to students for each activity by (1) projecting the day's agenda, project objectives, and other administrative details on the screen at the front of the class; (2) setting up and monitoring student group work with an online learning management system (LMS), and, (3) as needed, rephrasing and communicating clear oral instructions. Consistently, when it was time for the groups move on to a new activity, the teachers provided additional "just in time" instructions to each group and checked with all group members to ensure their understanding of the work to be done.

During group work time, both co-teachers visited each group and made themselves available for questions. For example, a typical interaction occurred when a teacher approached a group and listened quietly to monitor their talk and ensure that they were on task. The teacher then explained to the group that there were only 10 minutes left in class, and they should move to the last portion of the lesson.

One teacher explained that the students needed to read an article posted online that would help them reflect on the content they had explored that day [21:10–22:15]. Again, at two minutes before the end of class, the teacher reminded students to finish their assignments [27:50–28:14].

The co-teachers used the learning management system to monitor student work submitted throughout the class period (i.e., warm-up, journal activity, and main assignment).

Rating	Indicator
5	**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. Description, Rubric, and Examples

Evidence

This classroom structure is not ideally set up for group work; for example, some students sat with their backs to the front of the classroom while working at their computer stations. However, the teachers arranged student groups around each station so that there was plenty of room to walk around and check on students working in their groups. During the beginning of class activities, or whenever the students needed to be able to see the board where the agenda and instructions were projected, the teachers asked every student to turn around or move to the front of the classroom where they could see.

Rating	Indicator
5	**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). Description, Rubric, and Examples

Evidence

There were no observable instances of inequitable access to resources provided to students in this class session. The teachers visited each group frequently, and there were no observable biases displayed toward any student based on gender, language ability, etc. One of the activities did require that the students review and discuss each other's "planet brainstorm" posters from the previous day's activities, which had the potential for students to make derisive or negative feedback about their peers' ideas. However, students turned in their reflections on other students' work electronically to the teacher only; therefore, students whose work was displayed were unaware of any critique by their peers. One teacher called the group observed up to her desk for further discussion [9:50] and seemed to share a laugh about the students' ideas; however, the established teacher–student rapport allowed this interaction to occur without any observable impact on the learning or negative impact on the group's dynamics.

Synthesis Rating for Classroom Environment

Classroom culture is *non-interactive or non- productive*.	**Classroom culture is productive and interactive only *occasionally*.**	**Classroom culture is *adequately* productive and interactive.**	**Classroom culture is *often* productive and interactive, with some collegial interactions.**	**Classroom culture is *consistently* collegial, interactive, and productive.**
1	2	3	4	5

2. Lesson Structure

Rating	Indicator
5	**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). Description, Rubric, and Examples

Evidence

The objectives of the day's lesson and agenda were projected on the board at the front of the class when students walked in the classroom. One teacher began class [00:18–01:20] by providing an oral summary of the lesson's objectives and expectations for students during each part of the lesson. This lesson occurred at the beginning of the three-week project-based unit; therefore, the main goal was to begin identifying students' prior knowledge and misconceptions and to get the students thinking and brainstorming a process for accomplishing the goals of the project. The structure of the lesson successfully built on students' prior knowledge and helped identify misconceptions about content.

The lesson was organized into different chunks. First, the students summarized the overarching goals of the project in an individual journal entry. Next, students were assigned a warm-up to complete on their own. This warm-up was designed to assess students' understanding of the previous class activity exploring conics sections [06:10–06:44]. In groups, students discussed and reached consensus on defining the project goals and submitted this to the instructors as a group. After groups defined the goal of the project, students then moved on to an exploration of their peers' previously created ideas about the characteristics of a planet necessary to support life. This portion of the lesson, occurring after individual and group brainstorming, provided students with an opportunity to build understanding about the focus and content knowledge necessary to complete the project. In the final portion of the lesson, the students were assigned to read an article that summarized and challenged some of the ideas constructed from the group exploration.

Rating	Indicator
5	**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). Description, Rubric, and Examples

Evidence

The instructional strategies used in this lesson [10:50–11:39] followed a Predict-Observe-Explain (POE) strategy for inquiry-based exploration. The lesson required that student groups think and predict the essential characteristics of a planet that could sustain life. Prior to this lesson, students had been challenged to consider how they might design a planet that

could sustain life. To carry out the design, the students had to list all as many characteristics essential for life as they could imagine.

In order to support the students' discovery of truly essential characteristics, the teachers provided stations with all students' planets from the previous lesson. Each group walked to the stations and filled in a graphic organizer with four essential characteristics of a planet that could sustain life and four characteristics of a planet unnecessary to sustain life. Once the students had explained what they predicted in the graphic organizer, each group read an article (observe) that provided them with the essential components. They then had to compare those components with their predictions and reflect before the end of class (explain).

Rating	Indicator
5	**2.3 Lesson Assessments:** The structure of the lesson included opportunities for the instructor to gauge student understanding. Description, Rubric, and Examples

Evidence

One of the initial activities required that students write in their journal. The teachers provided immediate feedback to students by using a learning management system where students submitted all lesson materials electronically. The teachers walked around and checked these answers by putting a stamp [5:29] on the students' electronic record that let them know they had correctly completed the task. The teachers designed and established this stamping procedure for ongoing formative assessment. For example, the warm-up assignment completed individually was a strategy for measuring students' understanding of conic sections. The teachers created an electronic quiz that automatically graded student responses. This format provided an opportunity for students to receive immediate feedback and correct misunderstandings before moving on.

The online resources included instructions for the assignments and were available to all students as needed. The design of these online resources allowed the teachers the opportunity to walk around and informally assess students' understanding or difficulty with the content and activity. For example, one teacher reads what a group has written on their graphic organizer on the computer screen [19:16–20:03]. Based on their responses, the teacher assesses if they understand what the rings on planets are made up of. When the students answer correctly, she moves on to assess another component they have listed as nonessential, the moon. She asks students what the moon does for our planet. The teacher then uses this opportunity to ask guiding questions regarding the purpose of the moon in order to challenge the students' answer and help them make the best decision as to whether the moon is essential or nonessential to support life on a planet.

During the post-observation teacher interview, one teacher describes the format of her class as constant arena for formative assessments. She describes using "a lot of assessments" and describes the majority of class time as focused on giving students feedback or redirecting them toward the learning goals of the project.

Rating	Indicator
4	**2.4 Lesson Investigation:** The lesson included an investigative or problem-based approach to important concepts in mathematics or science. Description, Rubric, and Examples

Evidence

For the project introduced in this lesson, the students are challenged to design their own solar system, complete with a habitable planet, description of the orbits of other planets in the system, and identification of a habitable zone. This challenge requires that students use life sciences and Algebra II content. The project was introduced through an entry video intended to stimulate student curiosity and generate questions that need answers, creating the need to know that motivates the rest of the unit activities.

After the video, students were asked to identify the challenges proposed in the video in a journal entry. The exploration format of the lesson (described above in 2.2: Lesson Importance) was meant to guide students to start their problem-solving process. During this process, students needed to predict, using their personal experiences and academic knowledge acquired in prior science courses, the essential characteristics of a planet that could sustain life. Students then explored ideas presented by their peers to come up with their own list of characteristics.

Rating	Indicator
5	**2.5 Lesson Resources:** The teacher obtained and employed resources appropriate for the lesson. Description, Rubric, and Examples

Evidence

For the majority of the lesson, students were completing an exploration activity in which they would discover the essential characteristics of a planet that can support life. Sample student-created planets with written characteristics were available around the room for students to explore the science content. The students were provided an electronic graphic organizer, as well as computer access at their group stations, to complete this activity.

The final activity was for students to access an online "suitcase" of resources gathered by the teachers. An example includes the article provided in this day's lesson that explained the essential components required to sustain life on a planet. These online resources provided depth and expertise needed to support and develop student understanding of the mathematics and science content embedded not only in the day's lesson but throughout this project-based unit.

Rating	Indicator
5	**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.* Description, Rubric, and Examples

Evidence

In her reflection (post-observation interview) of the entire project, one teacher cited many strengths and weaknesses of the unit. For this particular lesson, the teacher described the rationale for starting with a "soft launch" of a project. Rather than launching the project formally with the entry video on the first day, the teachers initiated a soft launch during the previous class session, in which the students were introduced to two overarching mathematics and science concepts that would be made explicit in this first-day lesson: (1) characteristics of a planet necessary to support life, and (2) an introduction to conic sections.

One teacher attributes greater student interest and ability to focus on the purpose of the project during the actual launch day to this prior soft launch. This soft launch also allowed the teachers to begin identifying areas where students were struggling initially with the content. As for a weakness of this lesson, the teacher suggested that the project should have been called My Li'l Solar System instead of My Li'l Galaxy. Throughout this class session and periodically throughout the multi-week project unit, students frequently displayed confusion with the astronomy vocabulary, describing stars as planets and vice versa. Both teachers recognized that this was a "baby project," one that they had not implemented before and needed to modify for future use. For example, one teacher commented on how surprised he was that the students struggled with translation of the ellipses that described their planets' orbits off the origin. He thought this skill would be aided by the use of Geometer's Sketchpad but he still found that he had to add workshops and group tutoring sessions to help walk the students through this process.

Synthesis Rating for Lesson Structure

Lesson was *very poorly* structured to assist student learning.	**Lesson was *poorly* structured to assist student learning.**	**Lesson was *adequately* structured to assist student learning.**	**Lesson was *well* structured to assist student learning.**	**Lesson was *expertly* structured to assist student learning.**
1	2	3	4	5

3. Implementation

Rating	Indicator
4	**3.1 Implementation Questioning:** The teacher used questioning strategies to encourage participation, check on skill development, and facilitate intellectual engagement and productive interaction with students about important science and mathematics content and concepts. Description, Rubric, and Examples

Evidence

The majority of the class session observed was student-centered group work time. The teachers walked around to check on progress of students and asked questions to challenge student understanding and development of content. While with one group, one teacher realized that the students had listed the presence of a moon as nonessential to a planet that could support life. Although this is technically correct, the teacher challenged this assertion to ensure that students had thought critically about its implications. The teacher asked, "What does the moon do for us?" The students explained that it "does the tides." The teacher asked question about what else the moon does, and when the students were still missing a potentially critical feature of the moon, she asked, "You know how the moon has lots of craters—what causes those craters?" This probing question suggested that students consider that the moon protects the Earth from collisions with space debris. In addition, the exchange opened up a student misconception—that the moon was a star—but the opportunity to probe and build on students' misunderstanding was not followed up by the teacher [19:16–20:03].

Rating	Indicator
4	**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.). Description, Rubric, and Examples

Evidence

The video focused on one group, so it is hard to tell if all students were encouraged to be involved during the entire lesson. The teachers appeared to be constantly circulating and stopping at different groups to check for understanding and ensure time on task. This consistent monitoring of group progress ensured that once groups were ready to proceed to the next phase of the lesson, they were encouraged to do so by the teachers.

Rating	Indicator
4	**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.

	Description, Rubric, and Examples

Evidence

The teachers used formative assessment and questioning strategies to ensure that each group understood the instructions for the station group exploration activity. The teachers constantly circulated the room during group work time to check on students' understanding of the science content. For example, as soon as a group submitted their journal responses online, one teacher quickly checked it for accuracy, then provided the group with the next activity. Utilizing this strategy, the teacher was able to differentiate each part of the lesson for her students, based on their demonstration of key knowledge and skills. She also provided clear instructions and resources so that even the most advanced group was able to continue being engaged in the lesson [9:40–11:38].

Rating	Indicator
4	**3.4 Implementation Timing:** An appropriate amount of time was devoted to each part of the lesson. Description, Rubric, and Examples

Evidence

This video was a time-edited version of a 90-minute class session, so it is difficult for the observers to know exactly how much time was required or allotted for each portion of the designed lesson. However, it was evident in the video that the teachers implemented an effective set of strategies that kept the lesson flowing at rate appropriate for the students. Their use of an electronic LMS allowed consistent monitoring of student progress and adjustment of expectations of the time required for completion of assignments. For example, the final activity—reading a published article in the online resources and comparing the expert's ideas to their own—ran longer than anticipated. Due to the students' need for more time to reflect, the teachers did not complete a whole-class wrap-up or ask them for completion before the end of class. The teachers did make a point to check in with the whole class on their progress at 10 minutes and 2 minutes before the end of class [22:00–28:13].

Rating	Indicator
4	**3.5 Implementation Connections:** The instructional strategies and activities used in this lesson clearly connected to students' prior knowledge and experience. Description, Rubric, and Examples

Evidence

After introducing the project, teachers had students write a journal entry reflecting on their understanding of the content and identifying what they thought they'd need to learn in order to complete the project. Before the day's lesson, students were challenged to recall content from previous Life Science courses and list characteristics required of a planet that would

support life. For the main exploration activity, the teachers re-engaged students with the previous day's lesson by employing student work samples to stimulate their thinking and further develop their understanding of the lesson's standards [9:40–11:38]. Each group was asked to reflect on their classmates' ideas for essential components and make their own conjectures [12:16–14:31].

Rating	Indicator
NA	**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.* Description, Rubric, and Examples

Evidence

Not applicable.

Synthesis Rating for Implementation

Very poor **lesson implementation**	***Poor*** **lesson implementation**	***Adequate*** **lesson implementation**	***Good*** **lesson implementation**	***Excellent*** **lesson implementation**
1	2	3	4	5

4. Mathematics/Science Content

Rating	Indicator
4	**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). Description, Rubric, and Examples

Evidence

The content embedded in the overarching challenge of this project correlates with TEKS (Texas Essential Knowledge and Skills) for High School Physics 5B—"describe and calculate how the magnitude of the gravitational force between 2 objects depending on their masses and the distance between their centers"—and TEKS for High School Algebra II—"sketch graphs of conic sections to relate simple parameter changes in the equation to corresponding changes in the graph." Students were to design a solar system with three planets orbiting a star and determine and draw appropriate elliptical orbits for these three planets. The warm-up was a post-assessment on conic sections from a previous lesson, which again is one of the Algebra II state standards.

In addition, for this particular lesson, students needed to apply content knowledge acquired from previous biological sciences coursework in order to describe essential and nonessential components for life. Although these concepts are not explicitly related to standards in the Physics or Algebra II disciplines, the integration of content from other disciplines is significant, worthwhile, and developmentally appropriate for these students.

As described in the teacher interview, the content chosen for each of these lessons centered on the Algebra II standards and "layering physics [content] on." Although not clearly evident in this day's lesson, the physics content eventually covered in this project included calculating gravitational force between two objects, considering their masses and distance between their centers. In this particular lesson, the teachers were scaffolding student understanding of the project to eventually guide the students to this content.

This lesson did incorporate some thematic science and mathematical process standards. In all secondary sciences, students are expected to "make informed decisions using critical thinking and scientific problem solving." In Algebra II, students are expected to use "problem-solving, language and communication, and reasoning (justification and proof) to make connections within and outside mathematics."

The teachers made efforts to "spiral" these mathematical and science process standards throughout all their projects. Although physics content standards were not explicitly taught in this lesson, accessing and applying previously studied science standards were in evidence. For example, the students hypothesized possible characteristics of planets to support life, evaluated their peers' suggestions, and finally compared their results with expert knowledge.

Rating	Indicator
4	**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.). Description, Rubric, and Examples

Evidence

The teachers were able to communicate accurate content knowledge as well as provide an appropriate resource for students' continued learning, the scientific article. One teacher also asked a series of questions to elicit student thinking regarding the effects of the moon on life on Earth [19:16–20:03].

The teachers were able to communicate their content knowledge by providing accessible resources to students (the article), planning a sequence of activities to engage the students, and questioning to elicit student thinking and knowledge. The teachers were able to engage the students with probing questions to challenge their thinking, such as whether there is a need for seasons in order for life to exist on a planet (21:30–22:00).

Rating	Indicator
5	**4.3 Content Accuracy:** Teacher written and verbal content information was accurate. Description, Rubric, and Examples

Evidence

No content errors observed.

Rating	Indicator
5	**4.4 Content Assessments:** Formal assessments used by teacher (if available) were consistent with content objectives (homework, lab sheets, tests, quizzes, etc.). **It's possible that this indicator was not applicable to the observed lesson. You may rate NA in this case.* Description, Rubric, and Examples

Evidence

The content objectives for this particular lesson involved introducing students to the primary challenge of the project and reviewing previously learned and constructed content about essential characteristics of a planet that could support life. In addition to the warm-up check for understanding and retention of knowledge dealing with conic sections, throughout the lesson the teachers checked for student understanding and student progress using the

electronic stamping process described in 2.3 Lesson Assessments [5:29]. This was an automated check, as the students entered an answer, the teacher would immediately see if the students got it right through a spreadsheet with red, yellow, or green indicating if a student answered correctly or not [06:15]. Besides this, the teacher often used a physical stamp to provide feedback to students about their work in their Interactive Journals. In these journals, students wrote notes from workshops, created graphic organizers, and, in this day's lesson, wrote what they knew about the challenge of the project. This allowed the students to stay on task and the teacher to quickly assess student progress.

Rating	Indicator
3	**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.). **It's possible that this indicator was not applicable to the observed lesson. You may rate NA in this case.* Description, Rubric, and Examples

Evidence

Multiple representations and highly engaging visuals of solar systems, planetary orbits, and potential life forms were shared with students when they were introduced to the project while watching the entry video [2:00–4:50]. Although the level of stimulation with the video was high and although many of the models presented were accurate, there was little discussion of the details of these complex systems, because the purpose was simply to introduce students to the project goals.

Rating	Indicator
2	**4.6 Content Relevance:** During the lesson, it was made explicit to students why the content is important to learn. Description, Rubric, and Examples

Evidence

This lesson was nested within a larger project-based unit in which the students were challenged to design a solar system that included one planet that could support some forms of life. Although the content of the lesson was important for students to learn in order to successfully complete the work on this project, the teachers never explicitly explained why the content was important outside the context of the class assignment (i.e., the relevance of the content was described as necessary to accomplish the project and nothing more).

In the post-observation teacher interview, the teachers acknowledged that there was limited content in the entry video besides introducing the students to astronomical terms and definitions. The teachers stated that this entry lesson was intended to pique student curiosity in the subject so that they would be motivated to delve into the exploration of necessary

science and mathematics content and concepts and learn the requisite skills needed to accomplish the project goals.

Rating	Indicator
2	**4.7 Content Interconnections:** Appropriate connections were made to other areas of mathematics or science and/or to other disciplines (including non-school contexts). Description, Rubric, and Examples

Evidence

The overarching My L'il Galaxy project integrates Algebra II and science content. The entry video explained that the students would use conic sections to define the orbits of the planets in their solar system and design planets that could be inhabited by life [2:00–4:50]. Although not explicitly stated, the lesson did create an opportunity for connections between the characteristics necessary for life and the characteristics of living organisms, an essential biology concept.

Rating	Indicator
1	**4.8 Content Societal Impact:** During the lesson, there was discussion about the content topic's role in history or current events. Description, Rubric, and Examples

Evidence

There was no mention of this content's role in history or current events.

Synthesis Rating for Mathematics/Science Content

Students learning *inaccurate* content knowledge	Students learning *superficial* content knowledge	Students learning *adequate* content knowledge	Students learning *good* content knowledge	Students learning *deep, fluid* content knowledge
1	2	3	4	5

IV. SUMMARY COMMENTS

Information included in the "Summary Comments" section of the UTOP provides readers with a snapshot of the observer's evaluation of the quality of the lesson. When filling in this section, the observer should consider all available information concerning the lesson and its context and purpose, as well as his or her own judgment of the relative importance of the ratings given. The summary is intended to be freeform and can also include comments that did not fit into any of the preceding sections.

FIELD NOTES

Use this space to take field notes, capture comments from student–student or student–teacher conversations, describe the physical, socio-emotional, or cultural environment of the classroom interactions, and so on. Field notes can be edited and inserted into the Evidence boxes under each indicator to illustrate your rationale for assigning a particular score for that indicator.

Be sure to REMOVE all notes prior to sharing with anyone!