UTeach Observation Protocol (UTOP) Sample Scoring: Grade 8 Science, Energy Transfer[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 classroom observed in the AU4 Energy Transfer video on the TIMSS website: http://timssvideo.com/93.

I. BACKGROUND INFORMATION

Teacher: AU4 Energy Transfer
School: NA
Date of Observation: NA
Start and End Time of Observation: NA
Date of Post Interview: NA
Method of Post-Interview: _____ Face-to-face _____ Phone _____ Email
Subject Observed: Science
Grade Level: 8
Course Level: (Regular or Advanced/Accelerated): NA
Observer: UTOP Experts

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 was a double block (74 minutes) that was designed to develop student conceptions about energy transfer and energy transformation through direct-teach whole-class discussions and small-group interaction with guided student inquiries.
>
> After the teacher introduced the lesson with a real-world example of energy transfer and clear definitions written on the board that distinguished energy transfer from energy transformations, students were guided through nine independent lab stations, where they performed specific activities that demonstrated these topics. The teacher monitored student progress by moving around the classroom and even out of doors to observe and assist students in the completion of the activities and worksheet notes. At the end of the class, the teacher directed students to clean up their lab stations and handed out a homework assignment meant to assess what they had learned.

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[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 grade 8 science classroom. For more information about the UTOP, see http://utop.uteach.utexas.edu.

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
3	**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

The students were carefully guided through the activities and strongly directed by the teacher through some of the more challenging ones to ensure that everyone "got the right answer" and used the appropriate vocabulary as they completed the lab worksheet with these correct responses. Student talk and questioning was generally limited to questions focused on procedures. For example, one group of students made a novel observation about the coolness of one of the test tube reactions [presumably a mixture of baking soda and vinegar], but the teacher did not follow up on this with a probing question to explore why this might be happening and told her to "clean it out" and "get ready to move on."

The teacher consistently asked students questions that limited their responses to single vocabulary words. There was also little substantive questioning or discussion about the underlying mechanisms for energy transfer or transformations observed. Both teacher and students seemed content to simply apply the appropriate vocabulary and draw the required and expected energy chains using the fill-in-the-blank worksheet for data collection.

However, in one instance a student asked if the movement of the electrons in a circuit could be considered kinetic energy, but the teacher quickly shut the discussion down by responding that electrical energy was the movement of electrons and without that movement there would be no electrical energy. For the majority of the time while students were conducting these inquiries, there was little more than superficial interaction with the content of the lesson.

Rating	Indicator
3	**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

All students were actively working through the steps of the activities and filling in the blanks and energy chain diagrams on the worksheet. Students worked continually and collegially throughout the session.

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

Evidence

This observer did not see any off-task behaviors; however, the teacher described some instances where some groups had not properly used the equipment, such as "twisted it too hard" [Station 9] or "shouldn't be holding anything with your hands . . . there's tongs there" [Station 2].

Rating	Indicator
3	**1.4 Classroom Management:** The teacher's classroom management strategies enhanced the classroom environment. Description, Rubric, and Examples

Evidence

The teacher demonstrated clear command and the ability to manage student movement through the activities at each lab station quickly and effectively, and the students appeared to be able to work productively and treat each other and the teacher with respect. Nonetheless, the breakneck pace at which students were pushed through each station negatively impacted the learning because there was so little time allowed for intellectual engagement or deeper learning by the students.

Rating	Indicator
3	**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

For some of the lab activities, the teacher had the materials readily accessible and monitored student groups. She kept the groups moving through each lab station in a timely fashion so that the activities flowed smoothly. However, one group had to leave the classroom to explore the solar cells, and the teacher had to leave the classroom with Bunsen burners in use while observing this outdoor group. Some students were also sent out of the classroom to get hot water until the teacher was informed that there was a hot water tap in the classroom. Another group was also sent out to the teacher workroom to get assistance to repair a broken set of materials; this group of students also missed a few station rotations while looking for new materials.

Rating	Indicator
3	**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

The teacher assigned students to cooperative lab groups as they entered the classroom, although specific role assignments were not evident. The teacher discussed in her commentary after the lesson that she assigned students to groups to obtain a heterogeneous mix and so that the brighter students could coach the slower ones.

She also discussed having multiple ways for students to interact with the materials—by writing down definitions and terms as well as by moving around and handling the lab material in their groups.

The groups appeared to be composed of single sex, possibly a strategy that the teacher found successful for middle school students. The groups did appear to work productively. There were a few instances where the teacher made reference to "the boys" leaving materials in disarray or sternly reprimanded a lab group of boys for not following directions and using too much of the bicarbonate. These may be instances of gender bias but may also be interpreted as an unsuccessful attempt to carefully manage a lab situation that poses potential hazards to students. See clip excerpts below.

> **[30:20–30:45]** The teacher abruptly accuses a female student of not listening and uses a very belittling and disrespectful tone. The student appears to be somewhat apprehensive to answer

the question rather than not listening; she is attentive and could follow the directions the teacher was giving. Toward the end of the clip, the student says she thinks she knows the correct answer, and the teacher offers no response. To increase the rating on this indicator, the teacher could have offered more wait time for answers to her question or simply not accused the student.

[38:37–39:10] The teacher gets upset at students for using too much baking soda. This is the result of unclear directions, not student error. Her harsh tone and accusations were not necessary.

[43:20–43:45] This is the same group of boys that were referenced earlier. One of the students asks a question about the different types of energies and the teacher does not answer. She does find time to bluntly state that the group is holding up the class again, when it is apparent that every group is setting up their lab station. It is easy to get the feeling that she does not particularly like this group of boys as much as the rest of the class.

[53:40–53:46] The teacher has a harsh tone when referencing a group of boys.

[53:50–53:56] The teacher has a slightly degrading tone when talking about the group of boys to the group of girls: "The boys should not have left them out. Excellent, girls." If this were the only instance of the teacher referencing groups of boys with a negative tone, it would not be rated so low, but because it occurred consistently throughout the class, we get the feeling she favors teaching females over males.

[60:00–60:26] The teacher tells a student, "You could have killed us all" because the Bunsen burner gas was left on for an extended period of time. When the camera pans back, it is possible to see the expression on the student's face.

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
2/3	**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

From the lesson plan, the objectives of the lesson were the following:

- For students to know what is meant by energy transfers and energy transformations.
- To allow students to do experiments and describe what happened in terms of energy transfers and energy transformations.

Though these objectives were low level and not designed to build deep student understanding of the concepts, activities and stations chosen did allow students to accomplish the objectives 50 to 75% of the time. Nonetheless, the sheer number of activities (9) limited student time at each station, which can result in opportunity for only surface-level engagement.

Rating	Indicator
1/2	**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 lesson structure limited students' abilities to think deeply about the concepts illustrated with the lab activities. The objectives could be accomplished with very little independent thought, as the opening lecture was designed to lead students to arrive at the "right answer" and the worksheet was designed to prompt students to fill in the blanks of their data collection accordingly. The structure of the lesson—introduction, "lab," wrap up—did not allow much time for the students to complete each station. Also, students were not encouraged in the lesson plan or on the worksheet to manipulate the materials in any way but as proscribed by the teacher. Although the vocabulary and energy chains drawn on the lab worksheet defined key concepts about energy transfer and transformations, the structure of the lesson did not allow students to think about the mechanisms that cause the phenomena observed, leaving the significance of this content unexplored.

Rating	Indicator
1/2	**2.3 Lesson Assessments:** The structure of the lesson included opportunities for the instructor to gauge student understanding. Description, Rubric, and Examples

Evidence

The structure of the lesson, with students working in groups and the teacher moving constantly to check on their progress, could potentially allow for opportunities to gauge student understanding. However, there were no prescribed "checking for understanding" instances or time allotments in the lesson plan beyond filling in the blanks on the worksheet.

Rating	Indicator
2	**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

The lesson was designed as a highly structured and tightly guided form of inquiry that does not allow students to carry out activities that illustrated different types of energy transfer or energy transformations.

Rating	Indicator
2	**2.5 Lesson Resources:** The teacher obtained and employed resources appropriate for the lesson. Description, Rubric, and Examples

Evidence

The lab stations were large enough for student groups of 2 or 3 to gather data and have access to materials, including safety equipment, and for the teacher to be able to observe and interact. According to the lesson commentary, this set up took a lot of time on the part of the teacher. Safety goggles were placed at stations where they should be used, and the teacher verbally stated that students should use these goggles when working at these stations. However, some materials, such as darkened glasses to protect the retina and a fume hood to capture gases produced when burning steel wool or magnesium, were not evident. There was also no mention of lab safety in the lesson plan.

Rating	Indicator
2	**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

The teacher commentary described several things that this teacher would do differently if teaching this lesson again. The teacher recognized, for example, that the introduction went too long and that the students should be given the opportunity to come up with their own operational definitions of energy transfer and energy transformation first, before she defined these terms for them. However, she did not reflect on some of the problems that came from not assessing deep student understanding with her low-level questioning, hurrying the students through each lab station without opportunity for deep thought or intellectual engagement, and adhering strictly to students' completing the worksheet with the "right answers."

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
2	**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 teacher used questioning continually, in whole-class teacher-led discussions and with students conducting group activities at the lab stations. However, the questions asked were strictly procedural or focused only on the correct application of vocabulary terms. No instances of questions that challenged students to think critically or explore what students thought about the mechanisms underlying energy transfer or energy transformations were observed.

Rating	Indicator
3	**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 teacher appeared to engage and involve all students in the lesson throughout the teacher-led whole-class discussion as well as in the cooperative group work when students were conducting the guided inquiries at lab stations. The teacher continually moved throughout the room and frequently checked in with multiple student groups, particularly at the lab stations where the students were having difficulty observing what was expected or when using equipment, such as Bunsen burners, that posed some safety hazards.

Rating	Indicator
1	**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

Although the teacher continually asked students questions related to the answers they were to draw from conducting the guided inquiries, the majority of the students were unable to give

the "correct" response, and the teacher simply told them what it was or asked another fact-focused question to prompt the "correct" response. The teacher did not often use the materials or appear to make modifications to the activities to scaffold or emphasize important concepts that students struggled with. For a detailed example, see the transcript below or watch the video from 27:55 to 28:53.

> **[27:55]** Hold the magnet still inside the (inaudible) induction, watch the milliamp meter. Does anything happen? While I'm holding it there?
>
> **[28:02]** No. It's (inaudible) zero.
>
> **[28:03]** Right, nothing's happening. Move the magnet up and down inside the induction coil. What's happening now?
>
> **[28:10]** It's moving.
>
> **[28:11]** Good, what do you think a milliamp meter is measuring?
>
> **[28:17]** Um, (five).
>
> **[28:21]** Yeah, but what is it? What sort of thing is it measuring do you think? Have a guess. // Energy. //Yeah, what sort of energy?
>
> **[28:27]** Um, what's the magnet one, um.
>
> **[28:31]** No, not magnet, we used it for the light bulb earlier.
>
> **[28:35]** Mm, chemical?
>
> **[28:36]** No.
>
> **[28:37]** Kinetic.
>
> **[28:38]** No, electrical.
>
> **[28:39]** Oh, yeah.
>
> **[28:40]** Okay. Milliamp meter is measuring electrical energy, so what's hap-, what energy are we starting with?
>
> **[28:46]** Um.
>
> **[28:47]** What energy are we starting with?
>
> **[28:49]** Kinetic.
>
> **[28:50]** Kinetic, and what energy are we getting?
>
> **[28:51]** Electrical?
>
> **[28:53]** Electrical, there you go. Okay? So that's what you got to do. So you find workstation 8, and you answer your questions. And you could have a go at this, if you want, yourself.

Rating	Indicator
1/2	**3.4 Implementation Timing:** An appropriate amount of time was devoted to each part of the lesson. Description, Rubric, and Examples

Evidence

Most of the student groups were able to work quickly through the activities at each lab station, mainly because the level of teacher expectations for these explorations was limited and the students were not challenged to think critically about what they were observing. In many instances, the teacher took over conducting the activity and answered her own questions to ensure that students kept moving quickly and completed their worksheets with the correct vocabulary terms. One group was unable to complete all 9 stations by the time the rest of the class finished because they had been helping the teacher try to fix some of the equipment that was broken. Also, although there was a wrap-up portion of the lesson, the students were simply told to complete their homework as the bell was ringing without any clarification or time for questions.

Rating	Indicator
3	**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

The teacher provided an explicit example of energy transfer during the introduction to this class that was based in the students' everyday experience—stepping out of the shower onto a cold tile floor. The second teacher demonstration modeled energy transformation with the lighting of a light bulb when connecting a circuit with wires and a battery. The teacher asked several volunteers to explain what they thought about the difference between energy transfer and energy transformation based on their observation of these demonstrations in the introduction and in the wrap-up in a further attempt to connect the lesson topics to just-completed class lab activities and real-world experiences of all students.

Rating	Indicator
1	**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

Multiple instances of safety violations happened throughout this entire lesson. The teacher did not model wearing safety goggles and, even though she told students that the goggles must be worn and provided them at the appropriate station, she did not address students who failed to wear them. She also did not discuss how to handle the heated wires until a student burned her finger. At one point in the lesson, the teacher left the lab classroom with the majority of students still conducting inquiries with Bunsen burners and went outside with a group of students to investigate the energy transformation with solar cells. See clip excerpts below.

[31:50–32:05] The teacher stands and talks to a group of boys while they have a large yellow flame and one group member is not wearing goggles, and she does not correct their Bunsen burner technique.

[34:40–35:00] When the teacher's back is turned to the class, the students in the group behind her have a huge yellow flame on their Bunsen burner.

[35:50–36:01] When the teacher's back was turned again, a student takes goggles off near a Bunsen burner flame.

[36:45–37:00] When the teacher's back is turned, students break a test tube (or some type of glass object).

[37:45–37:51] A student is cleaning out a test tube with the goggles on top of his head.

[46:20–46:30] A student is working around a Bunsen burner flame without goggles on.

[48:40–49:00] The teacher stands and talks to a group of boys while they have a large yellow flame and does not correct their Bunsen burner technique.

[51:38–51:53] The instructor allows students to wear glasses rather than safety goggles. Glasses are not of the same safety caliber as safety goggles.

[55:00–55:10] The teacher is working with a group of boys around a Bunsen burner. The boy closest to her does not have goggles on, and she does not notice.

[57:20–57:40] Two of the three girls in this clip are wearing goggles. The girl who is not wearing goggles is the one holding and washing out the test tube. Toward the end of the clip, one group member leans over the lab station to wash out the test tube.

[59:40–60:00] One member of a group of girls tells the others to put on goggles in front of the teacher. However, the girl working on the Bunsen burner does not have goggles on and the teacher does not correct it.

[60:00–60:26] In this instance, a student turns on the gas for an extended period of time before lighting the Bunsen burner. This indicates a lack of lab safety technique on the part of the students. It appears that a review of Bunsen burner use would have been necessary.

[64:14–64:55] A group of girls left behind in their rotation have to make up two stations. The teacher watches a girl light the Bunsen burner without goggles on and then reach around the frame with long sleeves.

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
3	**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

Although the concepts of energy transfer and energy transformations are appropriate and worthwhile for exploration in eighth-grade science classes, the activities chosen were so tightly proscribed and controlled by the teacher that they did not allow students to develop any novel ideas, ask thoughtful questions, or increase their depth of conceptual understanding. In essence, the number and structure of the lab activities ensured that students would not be able to make meaningful connections to the concepts of energy transfer and transformations.

Rating	Indicator
2	**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 teacher's focus on the "right answer" for the worksheets gave the appearance of a lack of fluidity with many science concepts unpacked in the activities conducted and created several missed opportunities for challenging students and intellectually engaging them in the content. For example, the following dialogue indicates that the teacher may not fully understand or be able to more describe that individual electrons don't move in the wire or "flow"; it's the electric charge that "flows" when the circuit is complete.

> **[17:04]** With the battery one, would there also be kinetic, 'cause the electricity is moving?
>
> **[17:08]** Yeah, but electrical energy is the movement of electrons, so we don't really count it as kinetic. Okay, 'cause if there wasn't that movement, there wouldn't be any electricity.

Another example is the teacher's frequent and rather loose use of the terms "heat" and "energy." A more standard use of the term "heat" is the energy in transit from one substance to another. Once the energy is transferred, "heat" ceases to exist in the substance that has absorbed it. The teacher's use of "heat energy" transferred from the warm foot to the cold tile ["So we took heat energy from our foot and moved it to the tiles in the form of heat energy."]

could be propagating students' misconceptions about heat being a substance. (Note: This is a topic of active research and discussion in Physics Education Research field.)

Another issue is raised with the teacher's use of the term "theory" at the end of the introduction. ["All right, so that's your theory. So you need to know what an energy transfer is and what an energy transformation is."] This observer senses that she meant to use the term "hypothesis," although there was no evidence that she expected students to predict anything before conducting the demonstrations. These activities could have been designed to be more open-ended by asking for predictions and getting students to hypothesize or offer explanations for the phenomena they observed.

Rating	Indicator
2	**4.3 Content Accuracy:** Teacher written and verbal content information was accurate. Description, Rubric, and Examples

Evidence

The student worksheet provided for data collection contained numerous grammatical errors and also reflected the questionable use of the term "heat" in some instances, as described above. For example, under the questions for analysis of Station 2, Baking Soda & Water, question 2 asks, "When mixed, what form of energy is released?" Since this is an endothermic reaction, energy is actually absorbed and the test tube turns cool to the touch. In fact, one of the students in the video commented on the fact that her test tube turned cold, and the teacher ignored the comment. Since we do not have examples of what the teacher expected students to put in this blank, we can't be sure, but we suspect that asking students to describe the kind of energy released could be misleading and may indicate that the teacher is unaware of what really happens in this chemical reaction.

Rating	Indicator
2	**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 lab worksheet was consistent with the low level of teacher expectations and objectives as described for this lesson but poorly designed to allow students to fill-in-the-blanks with the correct terms.

Rating	Indicator
2	**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

There was no attempt to make connections to bigger ideas in the discipline such as the Law of Conservation of Energy or the Work–Energy Theorem, both fundamental ideas to all physical sciences and integral to any study of "energy" as a topic in a science class. In addition, there was no attempt to get students to think about or question or create models of the underlying mechanisms of the phenomena observed in these activities that illustrated various types of energy transfer and transformations. Although the energy chain diagrams could be considered some level of abstraction, the teacher did not ask the students to do more than apply vocabulary terms in a proscribed fashion by filling in the blanks. The activities afforded multiple opportunities for students to dig deeper and build a broader understanding about these concepts, but the teacher did not take advantage of them.

Rating	Indicator
1	**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

No evidence found. This is a lesson that could be used to highlight overarching and significant unifying principals such as the Law of Conservation of Energy, but no mention of this concept was found.

Rating	Indicator
1	**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

There was an attempt to make connection to students' personal experiences in non-school contexts in the introduction when the teacher discussed how "heat energy" was transferred

from their cold feet to the shower tiles. However, the opportunity to make a broader connection to the Law of Conservation of Energy or the Work–Energy Theorem or any other key topic in chemistry or physics was never mentioned. The teacher also ignored the everyday uses of the energy transfers and transformations that were illustrated in these activities even though she demonstrated completing a circuit to get a light bulb to glow during her introduction. It appeared the activities were conducted for the sake of conducting activities.

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

No evidence found.

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

*Due to the egregious nature of the safety violations, we could consider giving this a 1 for the Synthesis Rating.

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!