But What Does It Look Like? Illustrations of Disciplinary Literacy Teaching in Two Content Areas

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The authors offer a framework for disciplinary literacy teaching and two illustrations of disciplinary literacy teaching in classrooms.

There is growing consensus that disciplinary literacy teaching is necessary for advancing goals of college readiness and social justice (e.g., Lee & Spratley, 2010; Moje, 2007; Spires, Kerkhoff, & Graham, 2016). However, many still wonder, What does disciplinary literacy teaching look like? Would I recognize it if I saw it in my content area or in my school? How different is it from what I am doing already?

In this article, we offer two descriptions of classroom practice that illustrate central features of disciplinary literacy teaching in secondary subjects. We have drawn our illustrations from an ongoing, long-term study of how preservice teachers may be supported to learn to design and enact contextually sensitive disciplinary literacy teaching. In the long-term study, we have analyzed video records of practice routinely collected from skilled attending teachers (i.e., mentor teachers) and preservice teaching interns who are affiliated with one university-based secondary undergraduate teacher education program called Clinical Rounds. We report our empirical findings from the study elsewhere (Rainey, Maher, & Moje, 2017; Rainey, Moje, & Maher, 2016).

Disciplinary Literacy and Disciplinary Literacy Teaching

Disciplinary Literacy Practices

Twenty-first-century literacy involves flexible navigation among the many discourse communities of school and the everyday, including the ability to make deliberate choices about how and when to use the practices of each community (Alvermann & Moje, 2013; New London Group, 1996).

Disciplinary literacy practices are shared language and symbolic tools that members of academic disciplines (e.g., biology, philosophy, musical theater, architecture and design, psychology) use to construct knowledge alongside others. All disciplinarians engage in cycles of inquiry that enable knowledge production; inquiry includes articulating questions or problems for pursuit, investigating those questions using discipline-specific methods, communicating results of investigations to specific audiences, and evaluating one's own claims and those of others (Moje, 2015). Because the nature of the questions are distinct from

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discipline to discipline, and because of each discipline's own history of development, the literacy practices of each discipline vary.

Pursuing questions of history, for instance, requires historians to seek out and consider primary sources in specialized ways (Leinhardt & Young, 1996), including corroborating, contextualizing, and sourcing (Wineburg, 1991a, 1991b, 1998). Natural scientists, such as chemists, employ different language and literacy practices as a regular part of their work (Lemke, 1990). For instance, they consider multiple representations of data patterns using texts such as lab notes (Goldman & Bisanz, 2002), they develop and use models (NGSS Lead States, 2013), and they translate data across multiple forms and symbol systems (Pearson, Moje, & Greenleaf, 2010; Shanahan, Shanahan, & Misischia, 2011). Literary scholars, too, work with texts in specialized ways (Lee, Goldman, Levine, & Magliano, 2016; Lee & Spratley, 2010); guided by their construction and pursuit of literary problems or puzzles, literary scholars seek patterns within and across texts, identify strangeness within and across texts, consider histories of use and other contexts, and develop original interpretive claims (Rainey, 2017).

Disciplinary Literacy Teaching

Knowing what disciplinarians do does not entirely answer questions about what secondary teachers should do with students in their classrooms. In her review of education scholarship, Moje (2007) found four relatively distinct perspectives on disciplinary literacy pedagogy: (1) a focus on apprenticing students to the epistemological processes of disciplinarians, (2) a focus on cognitive strategies for supporting students' comprehension and production of texts, (3) a focus on teaching students how language works in the disciplines, and (4) a focus on teaching the ever-evolving cultural practices of the disciplines and connecting students' cultural practices to those of the disciplines. She argued that socially just subject matter teaching in secondary schools—teaching that supports all students to learn how to participate within and among the discourse communities of their lives, including the academic disciplines—would bring together these four lines of research.

Informed by her 2007 review, Moje (2015) advanced a 4-Es heuristic for disciplinary literacy teaching to represent the four overlapping categories of instructional practice related to the epistemological, cognitive, linguistic, and cultural lines of study in the field:

1. Engaging students in work that aligns with the problem- and text-based work of disciplinarians
2. Eliciting and engineering students' learning opportunities so they are able to successfully accomplish classroom tasks and learn disciplinary practice from them
3. Examining words, language, and representations
4. Evaluating words and ways with words within and across domains

Moje's (2015) heuristic for disciplinary literacy teaching is a helpful guide for considering what disciplinary literacy teaching must include and why. But what does it look like to engage adolescents in disciplinary inquiry with texts? What types of eliciting and engineering are useful for supporting such ambitious learning goals and use of texts? What about examining language and evaluating ways with words?

Overview and Program Description

In what follows, we offer two illustrations of disciplinary literacy teaching, highlighting Moje's (2015) 4-Es. The instances of disciplinary literacy teaching that we offer come from classroom videos of two highly skilled veteran teachers who are coauthors of this article. Rod Franchi teaches high school history, civics, and economics in the Novi Community School District in Michigan, and David Coupland teaches physics and computer science in Ann Arbor Public Schools in Michigan. Both teachers work as attending teachers in partnership with instructors in our university-based teacher education program called Clinical Rounds.

Clinical Rounds prepares undergraduates to teach in secondary classrooms. In 2005, the program was redesigned around goals of disciplinary literacy teaching and learning. Each semester in the program is organized to support situated and contextually sensitive practice, and each semester has a substantial field component (Bain, 2012; Bain & Moje, 2012). In the program, we routinely collect video data of attending teachers' classroom practice so we may study their inquiry-based literacy teaching approaches and provide teaching interns with models of disciplinary literacy teaching. As a part of the program, attending teachers routinely come together with university-based teacher educators to analyze teaching videos, to plan and lead programwide professional development workshops, and to generate new approaches for improving programmatic coherence.

Mr. Coupland and Mr. Franchi were each initially selected to work with preservice teachers because of their proficient teaching records in their disciplinary

specializations, their commitment to inquiry-based teaching with multiple forms of text, and their interest in helping to prepare novice teachers. Additionally, they are each recognized leaders among their respective school communities, and their students are consistently successful on multiple measures of academic achievement.

Taken together, these qualities and commitments define Mr. Coupland and Mr. Franchi as expert educators. We offer illustrations from their classrooms not because they necessarily represent typical practice but because they represent exemplary practice. We believe that their teaching approaches are learnable and that illustrations of teaching practice such as these may support others to develop similar approaches in their own classrooms. Our belief is bolstered by our research of preservice teachers' development of disciplinary literacy teaching. Novices in our program are afforded ongoing opportunities to observe and work with teachers like Mr. Coupland and Mr. Franchi, and novices' attempts to provide disciplinary literacy teaching tend to be evident even in their earliest teaching enactments in the program.

In the following sections, we describe and explicate aspects of disciplinary literacy teaching in two content areas at the level of the lesson. Although we focus on moments of classroom practice herein, it is important to note that both focal teachers seek to gradually apprentice students into specialized ways of reading, writing, and reasoning over the full arc of the school year. Whereas the 4-Es (Moje, 2015) are visible at the level of the lesson in our explication, they are also visible at the level of the unit and year in the teachers' actual practice.

History Literacy Teaching

The Lesson

We begin with a lesson taught by Mr. Franchi. In his 10th-grade U.S. history class, he first presented students with a protocol for analyzing primary sources in pursuit of a historical question. He said, "Historians don't read primary sources like others do....You read differently, you study [texts] differently....The protocol helps us unlock meaning...[but] you don't need to answer every question for every source. It is a menu." The guide included a set of historical literacy practices that students should draw on when reading primary and secondary sources and historical accounts, including sourcing, identifying the author's argument and potential biases, and generating new questions of the texts. It was November, and students had been using these historical literacy practices but were still learning when and how to apply them in combination while reading.

Then, Mr. Franchi posed the following question to students: "[The proposal in the early 1800s was that] all [American] Indian people must move to Indiana....[From the point of view of your assigned historical figure,] should this deal happen or not?"

Mr. Franchi assigned each student a different historical artifact (e.g., letter, transcribed political speech) to analyze independently using a graphic organizer, which prompted students' use of the historical literacy practices that he had named. The organizer ended by asking students to make a text-based claim about what the author of their source would say about the 19th-century political proposal that "all [American] Indian people must move to Indiana."

After students analyzed their sources, Mr. Franchi then facilitated students' debate about the question. When framing the debate, he established a set of expectations for how students should talk to one another, emphasizing that he would not be talking during the debate, so they should not look to him to keep the conversation moving. He called this routine "Don't look at me—even if I'm doing jumping jacks!" and indicated that it would be a classroom routine moving forward.

Students then began to introduce themselves as the author of the respective text they had reviewed, contributing that figure's perspective to the discussion:

Student 1: So, I'm John L. Sullivan, and I think, you know, that [the American Indians] should leave because we've spread our whole idea of freedom across the United States. Freedom is spread, from my point of view, all over.

Student 2: I'm Caroline Kirkland, and I disagree because you have that freedom. So, the native people, they were part of the land, and... when we came here, they shared their resources with us, and they shouldn't leave because they started that whole [idea] that everyone is equal in America.

Soon after, in response to an offer to buy land by a student representing Andrew Jackson's perspective, a student expressed a related but different perspective by saying, "I'm Tecumseh. And, so, you're just going to buy a country? So, could you buy America? Could you buy the land? Could you buy freedom? Could you buy air?" The discussion continued for about 20 minutes and included participation of almost all of the students in the room.

At the end of the lesson, Mr. Franchi asked students to characterize the divergent perspectives of the historical actors highlighted during the discussion. "As you look at the whole debate," he said, "what does it tell us about dynamics between white Americans and American Indians at this time?"

Finally, he facilitated a brief conversation about students' use of historical literacy practices, asking them to summarize their process and consider how practices help them construct knowledge of history. Mr. Franchi asked, "When you analyzed this as a historian, what did you notice?" and "As a historian, how did you put this [source] into perspective?"

Where's the Disciplinary Literacy Teaching in Mr. Franchi's Lesson?

This lesson reveals the complex interplay among engaging, engineering, examining, and evaluating that Mr. Franchi used to advance students' opportunities for historical literacy learning, even as they learned broader historical practices, content, and concepts.

Engaging. At the center of his lesson was a carefully crafted question. The question necessitated extended work with primary source documents that revealed differing points of view of various individuals of the time. It also required that students identify the somewhat nuanced perspectives represented within those texts to make and warrant claims about those individuals' perspectives during the discussion. To ultimately draw conclusions about the perspectives of historical figures, students had to ask questions of the texts, source their respective texts, recognize data points in relation to a question, look for patterns and anomalies in the data, and consider social and historical contexts in which their texts were produced. Thus, the majority of the class period was spent with students engaging in reading and reasoning practices of history.

Eliciting and Engineering. Because the texts and learning goals were challenging, Mr. Franchi engineered students' work carefully. His construction of the pursuable question as a debate among historical figures supported students' disciplinary literacy learning because it both required students to apply historical empathy and historical perspective and helped them build these skills in the process. Historical empathy is an orientation that is important when doing historical work, but it can be particularly challenging for adolescent students to bring historical empathy to their reading, writing, and reasoning, especially when they are considering events or actions that are recognized as unjust in today's time. Historical perspective taking allows for students to consider the human construction of historical accounts and identify ways to assess these accounts for interpreting the past. Moreover, the entire debate structure enabled Mr. Franchi to elicit students' historical reasoning with complex texts.

Another way that Mr. Franchi engineered students' disciplinary literacy learning was that he named a set of literacy practices of history. He told students that historians use shared practices to make meaning with primary sources, including sourcing and identifying bias, and he indicated that these literacy practices would be important for students to routinely use so they can learn to pursue historical questions. Notably, he framed these practices not as static rules that students should follow but as approaches to use flexibly and in combination to analyze historical texts.

Mr. Franchi's engineering was also evident in his direction giving, particularly in his description of the expectation that students should look at and talk to one another. He set a clear expectation that students were responsible for leading the conversation, and he supplied a routine that they would use throughout the remainder of the school year to support extended, student-led discussion.

Examining Words and Language. Mr. Franchi's graphic organizer protocol supported students as they individually examined the language of primary sources to consider the point of view that each historical actor may have held. To draw conclusions about a historical actor's perspective, each student needed to closely attend to the implicit meaning of words used by those authors. For instance, students closely attended to the word *freedom* and the meanings and assumptions that various historical figures communicated through their uses of it. Students returned to these close considerations of language as they engaged in Mr. Franchi's closing discussion about the larger historical implications of the time period under study. This lesson supported students' critical examination of language and perspective while reading and using primary accounts and helped establish ways that students would also learn to read and use secondary and tertiary sources (e.g., textbooks).

Evaluating Ways With Words. Throughout the lesson, Mr. Franchi positioned students as participants in the discourse community of history while at the same time building their understanding of historical literacy

practices as tools that serve particular purposes. At the beginning of the lesson, for instance, he reminded students that the historical literacy practices on the graphic organizer should be thought of as a flexible menu. At the end of the lesson, he led a brief metaconversation that invited students to begin to think more broadly about when, why, and how to use historical literacy practices such as sourcing. By asking students to consider what they did to put their artifacts into context, he laid groundwork for more in-depth evaluation of when, why, and how the shared practices of history are useful and when, why, and how they may not be as useful.

Physics Literacy Teaching

The Lesson

On the first day of a short unit on projectile motion in his 11th- and 12th-grade physics class, Mr. Coupland began by throwing a ball to a student in the front of the room. He told the class, "Watch what is happening and make some observations." Initially, students said things like, "It's a parabola," and "Constant velocity." Mr. Coupland then said,

> You're mixing observations and explanations....Focus on what you're observing....Try to use regular words...try to separate your understanding, which is considerable, from your observation. It's actually a barrier in science when you think you understand something. It's hard to see anything but what you think you'll see.

After students began to offer observations such as, "[The ball] goes up and down," and "It slows as it's going up," Mr. Coupland then asked them to consider what they can measure about the ball and its motion. He asked students to talk in groups about how to phrase an experimental question for their lab; two minutes later, he offered them sentence frames to use to start writing their experimental questions. While writing "What is the relationship between ___ and ___ for ___?" on the board, he said,

> This is a way to get started with experimental questions, and actually a lot of scientific papers follow this format. The question is, "What is the relationship between *blank* and *blank* for *blank*?" Another way is, "What is the effect of *blank* on *blank* for *blank*?" A lot of scientific papers have a title like "The Effect of X on Y for Z." Please rephrase your experimental questions [using this format].

Using the sentence frame, one group of students offered the following research question that would guide their inquiry for the day: "What is the relationship between position and time for a ball in projectile motion?" Other groups offered similar questions. Mr. Coupland then conducted a brief demonstration to show students how to use a software program that allowed them to import and analyze video of a ball's motion, and he offered brief reminders about how to keep notes in their lab notebooks, stating that records of scientific observations need to include the date and location of the observation along with careful descriptions about what happened and what it might mean in relation to the research question.

For the remainder of the class period (approximately 45 minutes), students excitedly worked together in small groups to conduct their work, representing their findings on whiteboards using multiple graphs, mathematical notation, and written explanations of the mathematical model produced in the investigation.

The next day, Mr. Coupland introduced an essay assignment in which students would be expected to make a scientific argument:

> The question [yesterday] was, What's the relationship between the variables? Now I want to put this into the kind of question that you might write a paper about, particularly if this were 500 years ago and you were Galileo and you were trying to understand the nature of motion. So, here's the question: In projectile motion, does the time it takes an object to fall a specified distance depend on the mass of the object or on the horizontal velocity of the object? You can assume air resistance is negligible.

Students were to make both a theoretical argument based on physical laws that they had been learning about all semester and an empirical argument using recorded data that they had generated in the previous day's classroom experiments. To construct an argument in physics, he told students that they should strive to follow "how it's done in physics," which includes giving an explanation of "naive conceptions" related to the question, "stat[ing] their claim," "present[ing] a theoretical argument using Newton's laws," and then making an argument presenting data and their interpretations. Mr. Coupland said,

> If I'm trying to convince you using evidence that this is the correct explanation, then that's an argument. But, it's a little different than an argument in English or social studies, because in English or social studies, usually you pick things that you could argue either way....In some sense, they're more or less equally valid. In science, we assume that at some point, we're all going to agree, but in the meantime, we can have an argument about it.

Then, Mr. Coupland facilitated students' talk about their findings from the experiments that they had conducted in small groups the day before. Students shared their systems maps, equations using data points that they had collected, and reasoning with one another by having a whiteboard discussion, which involved students standing in a circle around the room sharing the work that they had done on their large whiteboards.

To set the purpose for sharing experimental findings, Mr. Coupland reminded students that synthesizing the results of six experiments would be stronger evidence for their arguments than simply representing the results of one experiment. For this reason, he encouraged students to listen closely to their classmates' findings, considering how the findings relate to their own, and to take careful notes so they could precisely represent the whole body of evidence in their argument. During the discussion, most students participated in describing aspects of their group's findings and conclusions. Some students took notes as they listened to their classmates present. Multiple students also asked clarifying or substantive questions of the presenting groups, which Mr. Coupland commended.

Where's the Disciplinary Literacy Teaching in Mr. Coupland's Lesson?

Like Mr. Franchi's lesson, Mr. Coupland's teaching offers an illustration of Moje's (2015) 4-Es.

Engaging. Mr. Coupland's students were engaged in constructing, investigating, and communicating about questions of physics. Students worked together to draft precise and testable questions; to collect, record, and analyze data; and to represent their findings in multiple ways (i.e., graphs, equations, written prose). Their culminating assignment involved synthesizing the findings of all of the trials completed by the class and connecting those findings with theory. Mr. Coupland credits his approach to physics teaching to intensive professional development on the modeling method, which is a systematic method for engaging students in active scientific inquiry and discourse (Wells, Hestenes, & Swackhamer, 1995).

Eliciting and Engineering. Consistent with the modeling method, all of the scaffolding that Mr. Coupland offered was in the service of disciplinary inquiry. One way he engineered students' physics literacy learning was to name disciplinary literacy practices, assumptions, and conventions of the disciplinary community. An example of this was when he named typical parts of an argument in physics. Another example was when he offered students a template for constructing a pursuable question in physics.

Mr. Coupland prompted students to bring specialized literacy practices to the work of taking lab notes so they could return to those notes later to develop and support claims. Because students understood that they would be relying on their own lab notes to make larger arguments, it may have motivated their deliberate and careful note keeping.

He also elicited and supported students' disciplinary literacy learning by facilitating their work and talk together in the whiteboard discussion routine. Because students needed to represent their data and findings in multiple ways and then explain their reasoning to the class, students were prompted to work together to build a common understanding of both the phenomena under investigation and the technical and specialized ways of communicating scientific claims to an audience. Additionally, it gave Mr. Coupland many opportunities to notice and intervene when students' reasoning was faulty (e.g., when interpreting the meaning of a systems map) or their notation was unconventional (e.g., when they had marked axes on a systems map differently than the community norm).

Examining Words and Language. There were moments when Mr. Coupland supported students to examine words and ways with words in physics. A key moment was in his attention to the meaning and purpose of scientific observation. An observation—different from an explanation—is what you can see or otherwise notice, and when collecting and analyzing scientific data, it is important to ensure that observations are as free as possible from assumptions or expectations about a given phenomenon. By pressing students' conceptual understanding of the words *observation* and *explanation*, he also engineered their abilities to conduct meaningful data collection and analysis in their lab activity, and he supported their apprenticeship into the ways of doing physics.

Evaluating Ways With Words. There was one moment in this teaching sequence that exemplified evaluating how, when, and why to use particular ways with words across domains. When Mr. Coupland was describing to students the physics argument that they would be responsible for writing, he distinguished between assumptions that underlie claims of different academic

communities, highlighting a key difference between the nature of constructing knowledge in the natural sciences—an attempt to ultimately find consensus—and the tolerance for multiple, potentially competing claims of somewhat "equal...valid[ity]" in English literature and the social sciences.

In this moment, he indicated that there is an important difference in the assumption that writers of physics—and natural sciences more generally—bring to their work. Scientists assume that not all arguments or claims will be equally valid; over time, they assume that the community will come to a consensus about the question under debate. Although this is not the only way that evaluating ways with words across domains could look—as such a practice could also include critiquing ways with words or discussing when the discourse and rhetorical strategies of a writer may or may not be useful—it serves as an instance, nonetheless, that could meaningfully support students over time to learn to evaluate ways with words across disciplinary communities so they are better able to flexibly navigate the many discourse communities of their lives.

Discussion

The inquiry-based teaching approaches of Mr. Franchi and Mr. Coupland are tightly aligned with the bodies of scholarship on teaching and learning in each of their respective content areas (e.g., Bransford & Donovan, 2005; Minstrell & van Zee, 2017; Nokes, 2013; Osborne & Dillon, 2010; Stearns, Seixas, & Wineburg, 2000). Further, both teachers are guided by their syntheses of ambitious content learning standards (e.g., AP learning objectives and scoring standards, national standards documents). What's more, as we have watched and rewatched these teaching videos, our team has come to also regard the approaches of these educators as cutting-edge examples of disciplinary literacy teaching in our field. We believe that the cumulative effect of such teaching on young people's lives would be transformative, as it is radically different from the experiences that many students have in schools.

To engage students in disciplinary work, Mr. Franchi and Mr. Coupland framed their lessons with questions that were pursuable, recognizably disciplinary, open enough to invite students' construction of meaning, and guided enough to provide a structure for learning disciplinary practice. Mr. Franchi supplied a question in the form of a debate. Mr. Coupland engaged groups of students in constructing their own lab questions, and he allowed some difference in their finalized questions.

Once the problem space had been introduced, both teachers engineered opportunities for students to participate in building knowledge by naming disciplinary practices, assumptions, and conventions, including those with texts; reminding students to use disciplinary literacy practices; and facilitating routines that supported students in making meaning with texts in disciplinary ways. Throughout their lessons, these two teachers' engaging, engineering, examining, and evaluating moves were aligned in subtle and mutually reinforcing ways.

In designing and enacting layered, integrated literacy instruction that was fully in the service of disciplinary inquiry, both educators offered all students opportunities to learn to participate in the interesting and joyful work of constructing knowledge. Simultaneously, they honored who their students were, and they supported students' consideration of how they might ultimately use tools of inquiry, including disciplinary literacy practices, in their future learning and their lives.

It could be easy to read these cases and think, These students were advanced, so that is why these lessons went as they did. However, we have seen disciplinary literacy teaching like that we have described occurring in many Clinical Rounds attending teachers' classrooms—in middle schools and high schools, in honors and regular classes, in suburban and urban communities, and across all major academic domains. We do not mean to say that this type of teaching is happening everywhere. In our experience, this does not yet seem to be the case. However, we mean to say that we do not believe that this type of teaching is meant only for certain already privileged groups of students. In fact, the most school-reliant students are probably the ones who most desperately need regular opportunities for disciplinary literacy learning and who could most dramatically benefit from it.

To be sure, different groups of students may have required different types of engineering to meet the learning goals of these physics and history lessons. Less experienced readers may have benefited from metacognitive strategy instruction. Students who were relatively unfamiliar with an academic domain or a specific topic may have required more extended approaches to developing the necessary knowledge to engage with a pursuable question and make use of texts. Students who were less practiced at having classroom conversations and students who were learning English may have required more deliberate routines for participating in academic discussion. Yet, it is still possible to provide disciplinary literacy

teaching for all groups of students in ways that are responsive to their interests, needs, understandings, and skills.

Conclusion

We offer these brief illustrations of Mr. Franchi's and Mr. Coupland's disciplinary literacy teaching to show what it might look like to bring together epistemological, cognitive, linguistic, and cultural lines of education research in moments of classroom practice. Simply eliciting what students know and engineering students' access to texts (e.g., offering comprehension and strategy instruction) is unlikely to result in deep disciplinary learning. Similarly, engaging students in disciplinary inquiry without scaffolding is also unlikely to result in deep disciplinary learning. Further, without examining and evaluating words and ways with words, students are unlikely to learn to agentically navigate among the many domains of their lives, including the disciplinary communities. It is the careful combination of these aspects of instruction—designed in response to the specific young people in the classroom—that will offer students learning opportunities necessary for college readiness and engaged citizenship in the 21st century.

TAKE ACTION!

1. Talk with colleagues about the nature of the disciplinary work most related to your subject matter. How do disciplinarians in your content area ask questions, investigate those questions, communicate claims, and evaluate the claims of others?
2. Consider the alignment between your learning standards and the big questions that drive disciplinarians' work. What questions could guide your unit? How will you invite students into the disciplinary problem space?
3. Consider how you might use comprehension strategies, graphic organizers, and other literacy scaffolds to help students engage in disciplinary inquiry.
4. Watch a video recorded lesson and identify where students are engaging in disciplinary inquiry with texts. How is the teacher eliciting students' thinking, engineering students' learning, supporting students' examination of words and language, and helping students evaluate when, why, and how to use disciplinary ways with words?

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