

READING WRITING IN THE DISCIPLINES

Writing to Deepen Mathematical Understanding Video Transcript

Laura Mourino:

I kind of want to assess what information you have been able to synthesize and analyze and comprehend at this moment. Therefore, I really need you to work on this and think deeply about what the task is asking you for. So who would kindly read out the first question?

I gave them a picture of the unit circle, and I've asked them to write a letter to someone answering four questions.

Student:

"What mathematical applications or quantitative analysis can you make based on the diagram below?"

Mourino:

The reason why I gave this task was one, an opportunity for them to write, which I always enjoy doing in class. Two, an opportunity for me to have a check for understanding as to my past lessons on unit circles.

The second one, Kevin?

Kevin:

"Pose as many appropriate related questions about this diagram that comes to mind and share them with your reader."

Mourino:

By reading out loud, not only do I get a chance to see who might need special supports in reading, it also teaches me how to expand their vocabulary progressively. Can I use basic grammar, or can I start using higher-level words such as "assessing, analyzing, synthesizing, observing"?

What am I strongly emphasizing on this task?

Student:

"Be sure to use appropriate language, including validated responses, and provide sufficient quantitative analysis."

Mourino:

Will I be interested in proper grammar?

Student:

Yes.

Mourino:

Can you write this letter to absolutely anybody you want?

Student:

Yes.

Mourino:

Who would like loose-leaf? Who would like a laptop? So you may begin right now.

I have in class what I call quiet time, where they're forced to think about this completely by themselves, where they're not listening to somebody who's dominating the conversation and automatically they say, "Oh, the answer is this," so the child feels like, "Oh, I have to write that because so-and-so said that."

Student:

The letter kind of puts it in perspective. We can explain it better, whereas just writing numbers on my page would make sense to me at that time, but if I look back on it, I might be a little confused as to what was going on in my mind at that time.

Mourino:

As you're going through the exercise, if you're unable to make a quantitative analysis or a mathematical statement, move on to the second piece.

So basically, my choice of questions, they could pick an entry point.

Student:

I'm stuck.

Mourino:

You're stuck, okay, and that's okay, it happens sometimes. What's another word it's making you feel?

Student:

Frustrated.

Mourino:

Frustrated, very good. Let's continue to number three, then. Let's just go straight to number three.

Mourino:

The third one was reflecting on it. "How do I feel about this diagram, and is it frustrating me?" And the last one was making connection to past experiences.

Don't be wise guys. I don't want "Dear Reader." I already see five of them.

Most of the students started out with "Dear" and not a word.

Let's pause for a second. Who I send this letter, is it going to affect how I write to them?

Student:

Mm-hmm.

Mourino:

Yes. If you send it to a math teacher, what will that math teacher expect?

Student:

Vocabulary to be good, meaning math words and stuff.

Mourino:

But if I send it to my baby sister, what kind of language am I going to use?

Student:

Easy words.

Mourino:

Easy words, thank you. Therefore, from the beginning of this task, identify who your reader is, and that will set the tone for the rest of the letter. Now, at your group, in one voice, you're exchanging ideas. You may begin now.

Often, young people don't think they can learn from each other, and the largest source of education I think in a classroom is from their peers, not from the teacher.

Student:

I don't know what questions to ask because it's just a picture. Like, what am I supposed to get from this? Most of the questions that I would ask would be

clarifying questions, like "What's the point, what am I getting for this, what am I looking for?" I don't know.

Student:

It was, like, theoretical radians because there was nothing drawn there, so it's just, like, the points on where they would be, and I thought that was kind of random. Like, I don't know how necessary that really was. And not only the coordinates, just where it says, um, " $\pi/3$, $\pi/4$," it's sort of more theoretical.

Mourino:

When students are teaching each other or when they're given the opportunity to share and exchange ideas, that is much more powerful than me on the board putting up formulas.

Now that you've had a chance to exchange, and some of you guys had aha moments, like "Oh, I didn't think about that, that's interesting," improve your essay. "Something I learned from Shania." "Something that Jaylene said, oh wow, I didn't think of that." "Something that Jerry really inspired me to think about and reflect a little bit more deeply." And if you need to clarify from your peer what they said, ask for clarification, and then I will collect this.

When she asked you what direction, that's because the information you gave her was not clear to her. What's a more useful word I could have used instead of saying "from zero to 90"? What is she asking for? What direction?

Student:

Counter-clockwise.

Mourino:

Very good, counter-clockwise. That's why language is so important, okay? Let's be a little more specific. Excellent clarification, Vivian.

So the end of the activity was the charts, and there were stations.

You'll notice that every single table has a colored marker, so what I'm going to do now is each group, we're just going to play "ring around the table."

One of the reasons why I did charts and stations is because we put up the posters and we keep referring to the chart paper throughout the whole year, and we'll start knocking off stuff, and as we feel we've mastered that topic, it comes off the wall completely. So one of them says "Questions I have," and you're going to write down all the questions you had about this task. So we'll start here.

And this one says "statements," and here, you're going to write as many mathematical statements you included.

Michelle:

Everybody posed the ideas that they had come up with, whether it was for themselves or with their group, and we kind of put it to paper in a literal sense.

Student:

We should write that each quadrant equaled 90 degrees.

Student:

One went from zero to 90, and then another one, 90 to 180.

Mourino:

The other point of the chart paper is I gave the children a kinesthetic opportunity. Get up and move about, go ahead. Get up and move out.

Because they had 15 minutes of alone time of writing, they just needed to move and release some energy.

Move to the next station, please. Move to the next station.

And what's interesting is often, at the end of class, the kids don't realize how fast the class went by. And what a wonderful statement to hear from kids: "Wow, the class is over?" They want to still stay here.

Student:

I don't know if they're inverse or just cyclical reverse.

Student:

Are you talking about, like, a positive and a negative?

Student:

Yeah.

Mourino:

I don't ever want them to think of math class as "math class." I want them to think of it as a learning opportunity for all disciplines.

That's a perfect math statement. Excellent work, Shania.