READING WRITING IN THE DISCIPLINES

Collaborative Talk About Mathematics Video Transcript

Constantina Burow:
Okay, so our purpose today is to use our knowledge of exponential functions and apply them to logarithmic functions, okay? The first thing I need everybody to do is to open up to page 468. Remember, I was talking that this exponents and logs are really abstract. This book has kind of this neat thing in it to explain one of the reasons they use logs. When you're talking about exponents and logs, they do a lot of, like, earthquake stuff. You know, let's graph the earthquakes.

The read-aloud was about asteroids hitting the earth and the devastation that it causes. I'm trying to connect it to something real.

Can you guys just please read along while I read this out loud? So it says, "Many scientists believe the extinction of the dinosaurs was caused by an asteroid striking earth."

I use the book as a resource, and I want them to use it as a resource. So they are learning the skill because they're going to have to use the skill.

“To make comparing several objects easier, the Palermo Scale was developed using logarithms. The value of any object can be found using the equation PS = log base ten of R, where R is the relative risk posed by...”

I gave everybody an article. What I want you to do is, do you see the second paragraph at the top? I would like you to read, highlight anything you don't understand, and then I want you to talk to your neighbor, and then we're going to share out as a class, okay?

Sheridan:
Today we sort of took our knowledge about exponents, and we applied that to beginning to learn about logarithms.

Like, a positive two indicates that an event is 100 times more likely than a background impact. So it just, like, continues to, like, compare things to the background risk. That's, like, their average, I guess.

Student:
I don't know.

Sheridan:
I don't... yeah.

Burow:
Unless I see you interacting with the content, whatever that content is, I don't know how you're doing. And it's my job to step back and let you interact with that, and then I'm going to watch you and help if I have to.

David, tell me what you guys were struggling with.

David:
My own question is, how was it developed, and all that stuff? So that, like, without background information on it, I don't understand it. That's kind of my dilemma in this...

Burow:
That's a great question. What we're doing is we're trying to look at stuff that we have no clue what it means, and kind of make meaning out of it, because it's really important. And how we use this is, you know, when you're taking calculus, and you open up that book, it's going to look like that. And so we need to be okay with, like, "Okay, that looks crazy, that looks bizarre, but what do we know," okay? So let's look at that. I'm going to start with this. This was in the book.

For me, it's not the answer. It's how did we get to the answer? Do we understand how we got to the answer? What kind of different ways can we get to that answer?

Common logs and exponents -- that's what we've been doing -- are inverses. You actually know how to write this. You've just never written anything with log in it before. Okay? Looking at our notes from yesterday, we did Y = two raised to the X, and we made T tables. What I need us to do right now is graph this on our new graph paper. One, two, and then two, four.

You have to make sure everyone's on the same page. It's not about, "You do one problem, you do one problem, you do one problem." We all do it together. And so building that in takes a lot of scaffolding.

So then we're going to look at the inverse of this. If I have Y = 2 raised to the X, I'm going to switch the X and Ys. All right? And we're just going to make a T table.

I like to have them do some problem, so that I really know if they're understanding it.

What do I have to know about X and Y?

And this way we can have questions, you know, it's kind of a stop in the lesson, it's a little bit more organic for me, more fluid, and the students appreciate that. And so they kind of know the rhythm.

Why does this look weird? It's the opposite. That looks kind of weird, right? Doesn't it look like I wrote it backwards or something? Okay. Oh. Say that again.

Sheridan:
So where the... you get the one and the zero on your T table, that's your X intercept instead of your Y intercept.

Burow:
Wonderful. So let's graph this.

Reading graphs is just one of those really important skills that people just don't do enough of. And there are graphs and tables in newspapers and magazines and all the statistics.

Why would I be able to switch X and Ys? We're going to try to answer this question with our graphs. So you've got to hold your graph paper up to the light. And then what I want you to do is fold your two graphs on top of each other. So you're going to look through your paper, and match up your two graphs. And once it's matched, you can see it.

Students:
Oh...

Burow:
Tell me.

Sheridan:
If you can switch the X and Y values, then they must be the same.

Burow:
I like it.

Sheridan:
When we did the inverses and we saw that, like, the X = Y, whereas one was the Y intercept and one was the X intercept, that was my "aha" moment.

Burow:
Our whole purpose is to build that confidence in being in a group.

Student:
Like, the log is basically the inverse of the exponential function.

Burow:
The overreaching goal is learning college-going behavior. So even if they're not going to go to college, how can we help them transition into the adult world? You don't have to go to college. You're still going to work with people.

Student:
Yes, one half, and negative one.

Justine:
When you're working with a group, you're not only worrying about yourself, you're working... you're worrying about, like, everyone around you. You have to, like, realize that you're not the only priority. So I have to remember that I have to help others as well.

Sheridan:
The way that we're actually communicating and talking in group settings I think is the most important thing. Like, not that the math's not important, but being able to talk and sort of express my ideas to other people on something that's difficult, like a word problem, I think that's probably what I take the most out of when I'm doing math in this room.

Burow:
You need to read through the real world example six on page 471. They talk about a Richter scale, which is earthquakes. We're very familiar with that. I want you guys to have a conversation about what we've done, what they're talking about, and then try to answer the question, okay?

Student:
So do we always replace the X and the Y when we do logs?

Sheridan:
Yeah, because they swap.

Student:
Why?

Student:
Because it's the inverse. Yeah, like, the log is basically the inverse of the exponential function.

Sheridan:
So if we just, like, look at this, the Y minus one, you know, it drops down, and then it's to the other side, because we switch X and Y, you know? And then you have log base ten, because you know that ten is your base.

Burow:
I think if you're not creating a classroom, especially in high school, that you have these students talking and communicating and problem solving together, you're really setting them up to fail. They need to interact with the textbook, they need to interact with all those word problems. So any kind of vocabulary concepts, any kind of read-alouds, anywhere they are talking to each other, I think is... I think it's going to be key.

Student:
Y = log, subscript ten X.