

READING WRITING IN THE DISCIPLINES

Deconstructing Word Problems Video Transcript

Student:

You add $2 + x$ to equal 11 because 2 is the number of times that would defeat it and x is the variable of times they won the game. So then you're supposed to write $2 + x$, which would equal 11.

Student:

Rectangle, the question, because that's the most important part...

Kelly Gay:

We have, every single day in our class, content and language objectives, and what that means is, what are we going to be doing today?

As you see, for our content objective today, "Students will translate and solve one step equations from real world scenarios." How are we going to do that? Today, we're going to translate by first annotating and reading the problem in groups.

The language objective, that's usually where your literacy comes in, the "how we're going to do it." We're going to read, we're going to annotate, we're going to translate all in group work, and so you want to tell them specifically how you're going to do that.

Why are we going to translate problems?

Student:

Well, when something is in word form, you need to get it in math form so you can understand what it's saying to be able to work it out.

Gay:

Awesome. When something's in word form, we need to get it in math form, into our algebraic equation or our algebraic expression so we can work it out. So we have been translating, previously, algebraic expressions, however, that leaves us kind of at a point where it's unsolvable. We have $x + 3$, but that's all we can do. If we have another x , we might be able to combine it with the other x 's and get $2x + 3$, but from there we can't solve the problem. Kind of like a mathematical... or,

excuse me, kind of like a phrase in Language Arts class. "He went there." Do we know who "he" is?

Students:

No.

Gay:

Do we know where he went?

Students:

No.

Gay:

So can we do anything with that sentence?

Students:

No.

Gay:

No, it's incomplete. However, now, with our equations, the plot thickens. We now have all the power and we can solve. So for example, as you see on the board, I've got $x + 7 = 10$. We now know that $x = 3$ because we can solve that. So now we can say Sam went in a Food Lion to buy an apple pie. That's specific. We've solved it, we know who he is-- it's Sam. We know where he went-- he went to Food Lion-- and we know what he went to do-- buy an apple pie. So today, you guys are going to have the ability to solve problems, not just set them up. So you're going to take it a step or two further. So the first thing I wanted to do-- we've got a review word, and that's "expression." So, a variable or combination of variables, numbers and symbols that represent a mathematical relationship. Jordan, could you put it on our word wall for us? Thank you, Ma'am. So what's the first step in solving any word problem? Kardin?

Student:

Reading.

Gay:

Reading, we have to read the problem. So, reader, that's going to be your job. If you are selected as the reader today for the first station, that's going to be your main responsibility.

I was making sure everyone was clear of the roles that they would be taking on today: the reader, the translator, the annotator and the double checker.

Student:

They check over everybody's work and see if it's right and it makes sense.

Gay:

So before we actually turn you loose to start your group work on your own, I want to do a sample problem with you guys to make sure that you understand specifically all your roles and how you're going to do it on the graphic organizer I'm going to provide today.

Simply giving them a problem on the board and walking through, what's the most important part of this scenario?

Marissa?

Marissa:

You have to box the question.

Gay:

We have to box in the question. We need to know what the question is.

Doing that direct teaching was helpful for them.

So let's just mark that part straight out.

But then turning them on their own and letting them do it on their own.

Student:

Sam's high school played 11 hockey games this year and four were at night. The team won most of their games. They were defeated during two games. How many games did they win?

Gay:

Here's what I need you to do. Take out highlighters. Discuss with your group that everyone knows their roles.

Student:

We went to stations and we did different problems doing the five steps of one-step equations. So first, we read and then we annotated like we do in Language Arts and Social Studies.

Salma:

We can rectangle the question because that's the most important part, so... It's only asking you how many ink cartridges can you buy if each one costs \$11. So it doesn't matter what size it is.

Marissa:

So, like, I think you should highlight like where if you buy with \$77 and it costs like \$11 each.

Salma:

We should highlight that, yeah.

Student:

Annotator.

Student:

We don't really need... we don't care that it has large and small ink cartridges. In the question, we need stuff underlined...

Student:

So this, like, gives space to also underline.

Student:

Yeah, so we're just going to do the extra large box.

Gay:

When you change problems, switch name tags so you all have a chance to try a new role. The important part is that each person in your group is learning the different roles that it takes in order to solve a real world equation, okay?

Student:

So we need to box in, "They were defeated during two games. How many games did they win?" So, "How many games did they win?" And we can also cross out "The team won most of their games."

Student:

It said "How many did they win?" Then wouldn't that be the variable in the situation?

Student:

Now we go to the translator. That's your job. It says, "They played 11 hockey games." We probably should put the equal sign behind it. We should put 11.

"They got defeated two times." So probably, it would be $2 + x$, because the x would represent how many times they won.

Student:

Okay.

Student:

One way you can do it is by doing $2 - 11$, and then you would get x .

Student:

You can do that, but I think it would be easier.

Gay:

I was able to walk to each table and get a sense of who's doing what, what's happening, if they've got a clear understanding.

So, Arie, can you repeat what you just said one more time and then let your group members decide if that makes sense or not?

Arie:

Okay, so, they did 11 games and they lost two games. And so I did $11 - 9$. But if I just did $2 + c = 11$, it would be the same thing.

Gay:

Okay, perfect. So do you guys hear what Arie's saying? And that's what I really want you to talk about in each group is, okay, so we know that two of those games they lost, they played 11, then it makes sense that they must have won nine, right? Because nine plus two is 11. So that's the part that you guys need to be double checking.

Student:

Ms. Gay likes us to, like, discuss our thoughts and what we think about the problem.

Gay:

Francisco, from what Aaliyah's read us, how does nine make sense as your answer?

Francisco:

Because, right here, they played 11 games, and since they lost two games, we need to find out how many games they won.

I try to show them my work and give them evidence how I got it by reading it again and showing them what I annotated and translating it.

Gay:

You guys just reasoned that out verbally to me, but now I need you to write it down because that's really supporting how you know your answer is nine. So we've got a volunteer willing to present problem number one. Take over, girlfriend.

Arie:

So we boxed in the question that we heard and then we crossed out "The company had large and small ink cartridges in stock" because we didn't need to know that to solve the problem, so who really cares about it?

Gay:

I've found any time a student says something versus a teacher, it's phenomenally more important to the rest of the students because it's in their words.

Arie explained our annotating. Johanna's going to explain to us translating.

Johanna:

So we did $c \times 11 = 77$.

Gay:

And what was c standing for in that portion of your problem?

Johanna:

It was standing for how many she bought.

Gay:

And double checker, could you explain your role really quickly?

Student:

We checked and we asked each other, "Does this make sense?" And everybody said yes, and then we divided 77 by 11, and we got seven.

Francisco:

In class, I learn how to translate problems from words to numbers and how to double check my answer.

Gay:

Within Common Core, they're wanting you to write and to get students to explain their thinking a lot more than just put down $x = 5$ on a piece of paper. There's four parts to literacy: the speaking to each other, the talking, having the discussions, the listening to what each other has to say and then the writing and the reading. So if you remember that there's those four parts and that a literacy skill can simply be having the students write down the steps of the day's lesson and then discuss it to one another...

Student:

And this one now would be our answer.

Student:

And we have to double check it.

Gay:

It really helps math teachers feel included in the sense of how to tackle literacy within their classroom.

Student:

So when we translated it, we did $2 + x$, which would equal 11. We did x because x will equal the amount of times they won the game.