

PROBLEM SOLVING: PENCIL BOX STAINING

STEVEN LEVY: This is an example of our boxes that we're making. Right? And here is what the wood looked like before. So you can see this has been stained. And now I have the problem in that I have to go to Mr. Cunningham

at the hardware store and I have to say, "Mr. Cunningham, we need some stain in order to cover all of our boxes." And he says, "Well, how much do you want?" And so what do I tell him? This is stained, as you notice, on this side, on this side, on the edges, inside, all around, every piece. The little round pegs are stained. The cams are stained. So, what I need you to do is, in your group, find out the total area of your box so I will know how much stain to ask Mr. Cunningham to buy.

STUDENT 1: 40 point...

STUDENT 2: Point... five.

STUDENT 1: Five.

STUDENT 2: Plus...

STUDENT 1: Plus...

STUDENT 2: 36.

STUDENT 1: 36.

STUDENT 2: Plus 16.8.

STUDENT 1: Hold on. Plus 16.8. Times...

STUDENT 2: No, no, no, no times. No times, no times.

STUDENT 3: Yes, because there
are two of these, two of these and two of those.

STUDENT 2: Oh, yeah. Oops. Times...

This is a good example of Standard for Mathematical Practice 1. The girls are really struggling to make sense out of the problem and determine what to do to solve it. And in doing so, they have to really persevere at the task.

STUDENT 3: 69.5...

STUDENT 1: 55. Point 55.

STUDENT 2: 160... so we better get... we better get...

STUDENT 3: I'm going to write
this down on a piece of paper. Okie-dokie.

STUDENT 2: Oh, shoot. We can't do it. Wait, stop. Cut, cut, cut, cut, cut.
That's not square feet. So...

STUDENT 3: What equals square inches?

STUDENT 2: Yeah, but...

STUDENT 1: This is square inches, and why are you saying it's square feet? Because it isn't, it's square inches.

STUDENT 2: We've got to add it to square feet.

STUDENT 1: Oh, no...

GOJAK: Oftentimes, kids really struggle with mathematics when they aren't told exactly what to do. That really is what this standard is all about. They need to make sense of problems, and when they don't know what to do, they really have to stick to it – that is, persevere in solving the problems.

STUDENT 2: That's not exactly a square foot. Let's just go get...

STUDENT 1: Hold on! We are sort of making.... 1.1 square feet and we're done, aren't we?

STUDENT 3: No, we have to find out how much money...

STUDENT 2: Yeah, but 26 times that would be more than 25 square feet. So we have to get a quart.

STUDENT 3: We should get a quart.

STUDENT 1: We should get one quart. That's \$8.40. Times... Wait, do times 26.

GOJAK: The first standard for mathematical practice challenges us as teachers to give students rich problems that they may not know what to do with. It's also important to determine when are we going to step in and become part of the students' conversation and when should we leave them alone to just struggle with the mathematics, make sense out of it and continue with their thinking.

STUDENT 3: A quart – we would get a quart and that would be \$8.40.