Transcript for *Teaching Student-Centered Mathematics*
Chapter 9, Interview 1 Video

John Van de Walle: "A lot of times the two areas of mathematics called measurement and geometry get mixed up. And, as a matter of fact, lots of school textbooks put those two pieces together, or lists of provincial objectives will put measurement and geometry together. That's really not helpful to us as teachers.

Let's make a distinction between measurement and geometry. Measurement has to do with assigning a number to some attribute of something. And when it comes to shapes, yes, we can measure shapes.

And what we usually measure about shapes are the lengths of segments, the areas of regions, and then we put that together, and we get the heights of solid shapes, and the surface areas of solid shapes, and the volumes of solid shapes. So, those are measures.

Always about coming up with a number that tells me how big, how long, something is. Geometry doesn't have those kinds of numbers at all. Doesn't even have to have 90 degrees, in other words, a right angle doesn't have to have, can be defined without ever talking about degrees, it's simply something that makes square corners.

We can go into that a little bit more, but it's not necessary. So, geometry is about shape, what shapes look like, how they're alike and different, how I can reason with shapes, and finding shapes in our world, and finding shapes in our environment, and learning to think about shapes. It's not number oriented.

How did these things get together? Well, there is a place where measurement and geometry overlap a little bit, and that's where we try to find formulas, specifically for area and volume. Because we don't measure area with a ruler or with an instrument, we measure area by measuring other pieces of a shape.

Let's start with a rectangle, for example. We don't directly measure the area of a rectangle. We measure the length of one of its sides, and the length of another side, and then we use a mathematical process, i.e. multiplication, to tell me how many squares fit inside of there.

So, there's some multiplication out of the arithmetic strand of mathematics, and there's some idea of what area means, but we're using geometric ideas about the attributes of a rectangle in order to get to the area.

And so, we have to understand rectangleness and what rectangle is -- geometry -- and we have to have some understanding of multiplication -- arithmetic -- and bring that together to get area formulas for rectangles, and parallelograms, and triangles, etc. So, you do use a little geometry there.

When you go to formulas for circles, for example, the distance around a circle, generally we don't call that perimeter, we call it circumference, is based on a really important geometric idea.

We don't measure around the circle. We measure across the circle, because all circles are similar, and every circle has the same ratio of the distance around to the distance across,

that ratio we call pi. The distance around divided by the distance across is a little more than three, 3.141 whatever, and that we call pi.

That that ratio is constant for all circles is a geometric concept. But I can use that concept to find other measures of the circle.

So, if I want to find the area of a circle, which would be a measurement idea, there are a couple of ways we can go about doing that that would utilize the ratio of the diameter to the circumference, in order to eventually get at the area of a circle.

And so, I can't get certain geometric formulas that are measurement issues, without knowing some geometry about the shapes that I'm trying to get the formulas for.

And so, that's the place where I think measurement and geometry cross. But other than that, geometry is about shapes and doesn't need numbers, and measurement's about numbers and doesn't need geometry, and they really are separate issues with separate agendas."