

TRANSCRIPT

## Planting the Seeds for CCSS-M, Part 1

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I'm going to talk more on the K-2 Practice Guide related to Common Core State Standards and how this type of Japanese curriculum materials support students to learn mathematics. So the Common Core State Standards, the states promised to implement in the fall of 2014; however, in some of the places it is not started yet. And one of the reasons is they do not have curriculum material; it's very difficult. So I always recommend, because you do not have a good curriculum yet, why don't you start with mathematical practice, so which you can implement in many different ways, using different...but just looking different in the existing textbook and then teach in different ways. So, that is my recommendation.

And then, as you know, that the Common Core State Standards mathematical practice number 1 is problem solving. So the problem solving is a big emphasis, and which is not new; since '80s. NCTM released An Agenda for Action in 1980s. They said '80s should be the decade for problem solving. So, by the way, what is the definition of problem solving? It's not just simply solving problems. So in the NCTM standards, problem solving means engaging a task for which the solution is not known in advance. That means if students knew how to solve a similar problem, we do not call it problem solving. We have a different name for it. Do you know how we call it? That's called "exercise." There is a subtle difference between exercise and problem solving, so that we should be able to...we encourage students to attack problem which students have never seen before, by themselves, and then students can use their prior knowledge to solve this problem. That is problem solving.

Sometimes we discourage...for example, like many students say, "Teacher, I have not learned this problem, tell me what I should do." Well, that is evidence of the lack of problem-solving skill, right? So we don't want to have such kind of students. Even if we give a problem students have never seen before, students say "I can do this," and then solve. That is perseverance, which is a big issue because it's not so common in the United States, even though that was emphasized since 1980s. "Good problems give students the chance to solidify and extend their knowledge and to stimulate new learning. Most mathematical concepts can be introduced through problems based on familiar experiences coming from the students' lives." This is a quote from the NCTM standards.

So what this means is, you want to give a problem which students have never seen before in the everyday lesson, in the everyday mathematics, right? And then through this process they struggle, productive struggle, which is kind of a buzzword; everybody is talking about it nowadays. Through the struggle, students should be able to learn something new. That means just solving a problem is not the goal; finding answer is not the goal. By finding solution, by finding answer, you want to learn something new. So the teacher's job is to give a challenging

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problem for students—not too difficult, not too easy, right amount of challengingness. Then, let them struggle and then bring these struggles to help students learn something new. In order to do so, students need to develop a range of strategies for solving problems, such as using diagrams, looking for patterns. That—strategy is very important. Strategy—if students have a strategy, you could solve it, and, moreover, the students should have multiple strategies, wide variety of strategies. Why? If one approach/strategy doesn't work, you don't want to give up. Mathematics is teach a way of thinking. If you teach more, if you teach for test, you never get more than test, more than you study, right?