The Teacher-to-Teacher initiative was created by the U.S. Department of Education to provide the latest strategies and research on educational practices that work in the classroom. This series features teachers from across the country presenting techniques that can be used with students of all ages. This series is just one way the Department of Education is helping teachers get the support they need so “No Child is Left Behind.” (MUSIC) Hello, I’m Kathy Ernst from Brattleboro, Vermont. I’ve been a teacher for almost 30 years. Nineteen of those years I spent working with children from kindergarten to eighth grade as a classroom teacher and a gifted and talented teacher. Currently, I work as a staff developer in schools implementing NSF funded, standards based math curricula. I do a lot of coaching of teachers, working side-by-side with them in lesson planning, implementations, and redirection. I’m working on ways that we can coach teachers better. I’m going to introduce you to a book called “The Teaching Gap” by James Stigler and James Hiebert. And this book – how many of you have heard about that book? Not a familiar one to you. This book is an analysis, of the results and analysis of the TIMS – the third international math and science study – some of you may have heard about that. It was conducted in the ‘90’s and they did a very comprehensive study of mathematics teaching in 41 countries all over the world. They had hundreds of hours of video tape, which they’d never done before. They went into classrooms and actually video-taped lessons. So what this book is about, is comparing Japanese, United States and German teaching in 8th grade. And a lot of the conclusions that they come up with are really appropriate to education, to teaching of elementary children. And what they found were some very interesting things. First of all, we know the Japanese students have consistently scored very high on a lot of different math tests. Well, Stigler and Hiebert say it’s really because of the teaching. Let’s examine the teaching practices there and see what we can learn from them. Well, there are many different practices. One of which is that colleagues work together to reflect on their lessons, they observe each other, they talk about what went well, what didn’t go well, what do we need to change, and how can we now support and extend student thinking. So they have a lot of time together to have these conversations and reflect on their work. Another piece that really stood out was that in the math classrooms, Japanese children spend a significant amount of time inventing their own strategies for addition and subtraction and other number operations. It’s not the teacher going up in front of the class, showing kids procedures and saying “Now you do it.” While there are times that teachers, after children have the understanding, will say “You know, now we’re going to learn a standard alga rhythm,” that doesn’t happen most of the time. A significant amount of time is spent where children are inventing procedures. And what we know is that when children invent procedures they construct an understanding of mathematics. Because through their invention, they’re exploring number relationships, and really building deeper understanding than if they were just told it. Stigler and Hiebert also characterize Japanese teaching and United States teaching in this way. They said an appropriate model for Japanese teaching would be structured problem solving. And in the United States the model is learning terms and practicing procedures – here’s how you do it, go practice it. So we're teaching kids in the United States procedures – we're not teaching them how to think. So we want to teach children how to think mathematically. So we're going to learn about computational fluency today through problem solving. And before we start with problem solving, I want to talk a little bit about what is a good problem solver, because each of you today in our short time together, is going to engage in some problems. What I want you to do is really think about yourself as a problem solver as it relates to these dispositions. And I believe you have a handout "A Good Problem Solver is…" Curious – that means you're going to wonder about things, you're going to ask questions, you're going to explore to find out more. A good problem solver is Flexible – it means you're going to look for more than one way of solving a problem. You're Persistent, you don't give up easily. You take time to think, and you keep trying. You're a Risk Taker – you try new or challenging things, you're not afraid of making mistakes and mistakes are learning opportunities. And it's so important for us as teachers to create a safe climate in our classrooms, where kids can say what their thinking is, without having to worry about whether people are going to call them stupid or wrong or dumb. Because if we don't know how children are thinking, we're not going to know how to support and extend their thinking. So it's important for us to have as comfortable an environment as possible, so that we can sort of open a window on to their thinking. And a good problem solver is reflective – you're going to take time to think about what you're doing, why you're doing it, whether it makes sense, and if I were to do this again, how would I do it better? – so these are dispositions that I want you to think about in yourself today, as you're problem solving. But, you know in all of my experience with learners, whether they're kindergarteners or adults, if I'm teaching a course or a class, I have these up on a poster in my classroom. And several years ago at a parent-teacher conference, one of the parents of my kindergarteners came to the meeting and she said, "You know, Kathy, I was struggling to open a bottle – a jar of pickles the other day, and Michael came up to me and said, 'You're doing really well, Mom, be persistent – keep at it!.'" So here was a little kindergartener using the language that I valued as a classroom teacher. These dispositions were important to me to instill in my children, so they were very aware of what these words meant. And when we would read books in literature we would talk about, now what character was curious in that story? And how was so-and-so flexible? So they're really talking about what these dispositions mean. Now, we know what a good problem solver is. I want to just go over some guidelines for problem solving, because we're going to be working together, and I don't want people to be intimidated, just as I don't want children to be intimidated. So these are guidelines that I use with children and adults. First of all, help each other do their best thinking. With children we'll do brain-storming. I'll say "What does it sound like? What does it look like in the classroom when we help each other do our best thinking?" So they'll come out with – you wouldn't believe the wonderful suggestions they'll come out with. Give help or a hint only if the learner wants it. Because sometimes a kid will be struggling and really get upset if you come over and give them the answer, or give them a hint that's more than a hint, and they're frustrated because who's done the thinking in that situation? Is it the learner or the teacher? The teacher. So we want to ask questions that are going to elicit the children's thinking. And we want to help learners discover solutions and mistakes, so if you're working with each other today and you disagree with somebody's answer, or you think that they're wrong – instead of saying "You know, that should be 42, not 43," think about a question that you can pose to that learner, and a question that you can pose is "How did you get that? Show me how you got that." And nine times out of ten, a learner, in the process of explaining how they got it will say "Oh, I forgot to do this," and that's empowering, and that's what we want to do in our classrooms. My kindergarteners were asking each other "how did you get that?", because that was part of the culture of our classroom – we're here to help each other do our best thinking. And if you disagree with someone's solution and ask how they got it and share your own thinking so you can get into a conversation and a debate and a deeper understanding of mathematics as a result. So, now that we have our guidelines, I would like you all to try a problem, solve it by yourself and then when you're finished share your solution with the person next to you. Here's the problem: 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9. (MUSIC) …And then I grouped the three and the seven to make ten, plus eleven, and then I put fifteen and nine together to make twenty-four. Okay, did you say ten and eleven was… Yes, I didn't group that yet. It was plus eleven. Okay. And I just went twenty-four. Because you got twenty-four from the fifteen and the nine, and then? Then I knew ten and twenty-four were thirty-four, and then I just went plus eleven. And you got? 45. Okay. How many of you went from left to right like that, in that way? Okay, some other folks did. Okay, yes? I had thought too with my third graders I would probably start on each end of the numbers and count to ten. Nine plus one is 10; eight plus two is 10; seven plus three is 10; six plus four is 10 and 5 in the middle would be 45. Okay, so what you're saying is that one and nine is 10; two and eight is 10; three and seven is 10; four and six is 10, and then you have that five left over. Forty-five. You went ten, twenty, thirty, forty-five, right? How many of you solved it that way? Okay, you just discovered by clustering these numbers in ten is that power of using friendly numbers in our number system. And that's what computational fluency kind of is the essence of. But before we go on, what strategy did we share first? It was the left to right strategy. Now that's a strategy that a lot of people tend to use, and why is that? Because we were taught that way, right? We were taught that way, but also, in my share, I scaffolded that intentionally, that when we share strategies, walk the room, as I did. Notice what strategies your children are using, and the ones that you know are going to be accessible to everybody are the ones that you share first. If you share with children the most sophisticated strategy first, and you've got kids looking at that and saying "I don't know how the heck that worked," you've lost them. You really want to make your share a teaching opportunity, so think about that. So let's talk about what do we mean by computational fluency? You all have a handout that says "How Do We Define Fluency?" It's written by Susan Jo Russell, and it's a much more detailed overhead than this that you see here, but she defines computational fluency as three parts – efficiency, accuracy, and flexibility. And efficiency means that the learner, the child, has a strategy with steps in which he or she doesn't get too bogged down, can keep track of all of the steps. Accuracy means a lot more than just getting the right answer. It means being accurate in all parts of the problem. It means accuracy in your recording, it means accuracy with number facts, it means once you get an answer, it means having the knowledge of knowing whether or not it's a reasonable answer – does it make sense? And also, now that I've got an answer, and it seems to make sense, I'm going to double-check my work. That's all part of accuracy. And the third piece is flexibility. It means that the learner has more than one way of solving a problem. So if I want to check my problem, I have a totally different solution path. Flexibility requires that kids know a lot about number and computation fluency in general means that they have to have deep understandings of our number system, number relationships, to really be able to come up with different ways of solving problems. So, that said, let's just take a look at this problem. Three thousand minus two hundred ninety-eight. Try that – share it with the person next to you. (MUSIC) I've gone around the room and I've seen a lot of people apply the traditional alga rhythm, right? How many of you applied the traditional alga rhythm? So how would we do that? We start at which side? Oh, we cross out the 3. How come we cross out the three? Okay, what are we regrouping here? Thousands to the hundreds, so we're actually regrouping, or trading, one of these thousands for what? Ten hundreds. We now have ten hundreds, now what are we doing? Okay, we're going to regroup one of the hundreds, take one of the hundreds, trade it for what? Ten tens, right? Now what do we do? We trade one of these tens for what? For 10 ones, now what do we do? Okay, what do we do? Subtract which one? Oh, subtract the ones, so what do we have? Ten, is two. And now we go to our tens, and 0. How many hundreds? Seven hundreds. Oh, and our thousands. Did anybody solve it differently? I did. How did you do that? Okay. So you said "I'm going to be lazy smart, right? I don't want to have so much work. I don't want to do all that trading, or regrouping, or whatever it is that we call it. But, I am going to really look at the value of these numbers, right? I've got three thousand, I'm going to keep that as three thousand, right? But, I'm going to change my 298 to 300, because that's easy for me, isn't it?" What's 3000, take away 300? 2700 – we knew that, because we all have number sense. We have to add our two and we get 2702. Which strategy was more efficient? The second strategy, okay? So the traditional alga rhythms are not always the most efficient. Someone who has computational fluency will be able to look at a problem, and not just begin to operate on digits. They're going to look at the whole number and have number sense and say "You know what? This is really not has hard as it seems. So I'm going to find a more efficient way to solve it." Let's try, since you're getting really good at this, we talked about using those friendly numbers before and I want you to now try this. Okay, let's share some solutions. What was one way? Did anybody go from our left to right way? Okay, some people are doing that. So you added 13 and 24 first? And what did you come up with? Thirty-seven, and then you added 17 and 36, which was? What did you get? Fifty-what? Fifty-three, added them together, is that what you did? And what did you get? Ninety, okay, who solved it a different way? I added 13 and 17 and got 30.

Okay, we have 13 + 24 + 17 + 36. You said 13 and 17 was what? Thirty. Okay. And 24 and 36 were 60. Okay. And that equals? 90. Ninety, okay, so far we have two different ways. Did somebody have a different way? Yes. I counted all the tens first. Ahh! So you looked at this as ten, plus twenty, plus is this right? Plus ten, plus thirty and that equaled? 70. Seventy, and then what did you do? Then I added all the ones – three and seven is another ten. Oh, so you said three and seven is ten and four and six is ten, so you had seventy and then another twenty. How many of you did it that way? Okay, some folks. Who did it a different way? So far, we have three different ways. Everybody has a different way of seeing numbers, but what we really want to do is let's make it easier. 10's are easy to work with. Landmark numbers are easy to work with, so let's try to use them. One more problem – Forty-eight plus twenty-seven. I just took away two from here, so it was fifty and this made it twenty-five, so it made it seventy-five. That is really nice! But normally I would go eight plus seven is fifteen, because I've always been stuck in that, you know. I haven't thought of doing it that way – I like that. Laurie had a good idea. Okay, tell us about it. Adding the tens and the ones, so I did that, and I realized right away that the four and the two, that was 60. Okay, let's look at this. Is this a four and is that a two? No. Okay, and that's something that we want, when we're having conversations with our children, we want them to be aware of the value of numbers and where we put that number in relation to the place-holder is critical, okay? So we want to use language like "That forty and that twenty," because that's two tens which is 20, four tens which is 40. When we talk about that as a four and a two, we're losing sight of the value of the number. We want kids to become computationally fluent and be thinking about the value and relative size of numbers. So? four tens, the 40 and the two tens, 20 was 60, and then. And I did that because I quickly realized that eight and seven was fifteen, and so I knew that would be easy to add to. Ahh – okay. And you got? Seventy-five. You got seventy-five. How many of you did it that way – by splitting the forty-eight and the twenty-seven? Okay, and you could do that pretty quickly mentally. I saw a lot of you getting really quick with that. What was another strategy somebody came up with? Yes. I took two away from the 27 and made that 25, and the 48 a 50. Do you see what she did? She took two – I'm just going to put that in a little box – away from the 27 and made it 25. She added two to the 48 to make it 50. Now we have two landmark numbers – two numbers that are so easy to add, aren't they? Boom! And what do we get? 75. We're taking two away from this one and adding it on to that one. It's compensation, and they come out, it's a much easier problem for us to work with, isn't it? What would happen – here's the curiosity piece, and as a teacher, you can always throw out an interesting question like this – what would happen if I try to solve it like this? Could I still use some of these methods if I put it vertically? Yes. Go out to the side and add 15 and... Okay or fifteen out to the side, or we could say eight and seven is 15, and then what would we add? 40 plus 20. What is 40 and 20? Sixty. Sixty, and what do we get when we add. It's 75. This method is called partial sums. It seems as though the method, or the procedure doesn't matter, as long as you're coming up with the correct answer. Now, feels like renaming or regrouping, are you saying that it's not necessary to teach any more of those particular skills? Oh, absolutely not! It's absolutely essential that children know the standard alga rhythms. What we, but what's important is when do we teach those standard alga rhythms? Do we teach it when we know that children have an understanding of additions, of subtractions. In Japanese classrooms – and I haven't been there, but I've seen video tape – children have a variety of ways of adding and subtracting numbers before their teacher teaches them the alga rhythm. The standard alga rhythm is not always the most efficient. And we know that when we teach alga rhythms to children before they have conceptual understanding, we're actually inhibiting their mathematical thinking (MUSIC)

(MUSIC) It's so important for us to know what are the big ideas underlying addition and subtraction. What are those ideas that children need to develop? So you have a handout called "Big Ideas Underlying Quantity, Addition and Subtraction." We start with one-to-one correspondence, which I'm sure you all have heard about. A child who understands one-to-one correspondence has constructed that is the child who, when you ask your class of twenty-two, "I've got 14 cartons of milk here. Will we have enough for everybody?" That child, who has constructed one-to-one correspondence, will say what? No, we don't. We have 22 kids; we need 22 milks, right? One of those strategies with one-to-one correspondence in counting things is what we call synchronic counting with tagging. You can try this. How many of you have seen children, as they're counting, go "1, 2, 3, 4, 5, 6, 7, 8, 9, 10," right? And they keep going – they could keep going 'til the cows come home, right? Because they haven't kept track of what they're counting. So, what I do with those little kids who are having a hard time is I might, in our summary discussion at the end of the lesson, get together and say "Gee, you know, I noticed that some kids are having a hard time keeping tract of their counts. Who has a good strategy – a way that you can keep track of things that you counted?" And, darn, if those kindergarteners, first graders, don't come up with many different ways of tagging and keeping track. We don't have to tell them, "Oh, separate as you're counting." If we give kids an opportunity to share their thinking, they will, and it's a wonderful thing to see. Hierarchical Inclusion is another very big idea. It's knowing that six and five and four and three and two and one are all contained in seven. So, if I have seven things, and I ask a child to count out "Count out seven things." Now, I'm going to cover up these things, and I am going to remove just one. How many of those little orange circles are covered? The child who struggles with an answer, is the child who has not yet constructed hierarchical inclusions. They don't realize that if I have seven things, and I take one away, there will be six. Cardinality, going to our next big idea, is knowing that when I count these seven things, the result of my counting seven means that I have seven things. So, a child who has not constructed cardinality, if you say "How many of these little red circles are here?" And they might go "1, 2, 3, 4, 5, 6, 7." "So, how many red circles do you have?" "1, 2, 3, 4, 5, 6, 7." How many of you have ever seen that with children? Okay, that's because they haven't yet constructed that big idea of cardinality, that I have seven things. Now, these big ideas are not necessarily going in a hierarchical order – these are just some big ideas. Compensation – we talked about that before – with the 48 and the 27, right? I learned about compensation from one of my little first grade guys, many, many years ago. I had my kids play card games all the time – for homework and in the classroom. And, I went over to one of my kids one day and he said, very quickly "six and four is ten." I said "How did you figure that out?" He goes "I just take one off the six and put it onto the four, and I've got five and five is 10." That's compensation, okay? Part/Whole Relationships are another very big idea that kids need to really construct. If they're adding four and three, the counting on, starting at four, and then going five, six, seven, or three, four, five, six, seven, is going to be confusing to them. They're not going to be able to do it if they don't have hierarchical inclusion and a sense of part/whole, that the three and the four are two parts that make the seven. Unitizing is a huge idea that's really essential for understanding place value, and this is so tricky for kids. It's being able to see ten things as one group. Now, how contradictory is that, right? Seeing ten things as one group. That symbol for one can represent just one or ten, depending on where I put it. Now, I'm going to show you a little assessment activity that I often do with children, to see if they're unitizing. "Can you count out x number of cubes, or circles, or whatever it is I have?" And – I will be the child right now. So, I've just given a prompt "Count out…" however many are here – 17 or 16. "1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17." I'll say "Could you write seventeen for me?" Okay, so I'll have the child write 17, and then I'll ask "Can you show me what part of this collection this number stands for?" And the child will go "1, 2, 3, 4, 5, 6, 7." And I'll ask "Okay, can you show me what part of this collection stands for?" The child who has not constructed unitizing will go one, and I'll say "Well, gee, that only makes 1, 2, 3, 4, 5, 6, 7, 8. What about the rest of these here?" If you're with a child, see what their response to that is. A lot of kids will say "Oh," and just go like that. Now, if a child seems to understand that "oh, that represents ten," then try that same assessment with a larger number, like 30-something or 40-something, to see if they really do understanding that, okay? Let's talk a little bit about how, what are some of the things that we can do to develop that understanding of place value with children. That leads us to our next overhead "Building on What Children Know and Understand." Do you all have that? There are strategies that children can develop that we can help them develop, but we want to keep in mind, we want to build on what they know and understand. We don't want to work from a deficit model – what don't they know? We need to find out – what do they know? So we can take them the next step. So, one of the first activities related to understanding number and developing computational fluency is being able to do what we call decomposed numbers. What I'd like you to do is look up here and tell me how many dots you see. You see seven, okay. How do you see seven dots? Could somebody tell me how they see seven? Okay, which, these five up here? These five and these two – so we can just decompose seven into five and two. What's another way of seeing? Okay, which six? Oh, these outside – so you're looking at actually these right here? You're saying "I see that as six," right? And one, so I've split the seven into six and one. What's another way of seeing seven? Four? – Which four? Oh, you're seeing these. Oops! And these up here. So, we split seven into three and four. But, these kinds of activities are so important for children to see, that within that seven, there's a five and two, and a four and a three, and a six and one. They need to integrate that understanding, and process that in as many different modalities as possible. Our next strategy, well, we've got doubles here. We know – we're not quite sure why – that it's easier for kids to remember their doubles than it is to remember other number facts, right? two and two, three and three, four and four – usually easier than four plus three. What I do with my children, is to play lots of card and dice games, so that they become really fluent in their doubles, because I then want to take what they know about doubles to help them solve near doubles – doubles plus one or doubles minus one. So, let's take a look at a number like eight plus seven. How can we use what we know about doubles to solve eight plus seven? What could we do? (Inaudible) Okay, we can say eight plus eight – boy I know that's 16, right? And just take away one. What's another double that might help us with eight plus seven? Seven and seven, okay? Somebody else might say, "Well, I know seven and seven is 14, so eight plus seven is going to be 14 plus one more, right? How easy is that? Okay, we don't want them counting on their fingers. Fingers are wonderful manipulatives for children, but there comes a time where they're better than that. We want them to be using their brains, we want them to be thinking, and so we want them to be solid in their doubles, so they can use what they know about doubles to solve harder problems. We've talked about compensation – decomposing and recomposing, so, for example, if I have a problem like seven plus five – for that child who has computational fluency, is thinking flexibly "Ah, I can take one off the seven, put it onto the five, and I've now got six and six, right?" That's compensation. Sums of ten – boy we want our kids to know sums of ten, why? Because ten is such a powerful number in our system – it's easy to work with. So, I'm going to show you very quickly a card game that you can play with kids, okay? And here's how it works. You have a deck of cards – I've removed all the face cards here. Aces are one – and the way it works is – my partner, I'll assume my partner has just made a three by three array and it's my turn to do the math talk and to find all sums of ten. Four and six is 10, five and five is 10, and I think that's about it. And kids might say "Can we use more than two cards?" Well, that's entirely up to you – sure you could use more than two cards. I could say eight and one and one is 10, couldn't I? So, my partner – pardon me? Oh, and ten is 10, right? And eight and one is nine and one more is 10. Boy, look at that, I wiped out the whole board. Okay. So now I would recreate the three by three array for my partner, and it would be my partner's turn. Now, what I insist when kids are playing games, is that they agree or disagree with each other before they move on to the next turn. I want the math talk going on. If they're disagreeing, I want them to say "I disagree, show me how you got that." Why? Because I want them to use what they know about sums of ten to solve other problems. So, for example, if I have a number fact that is seven plus four, what number fact is going to help me with that. If I know my number, my sums of ten, what's going to help me? Uh, so if I know those, I'll say "Uh, seven and three is 10, so seven and four is going to be one more." Build on what kids know, so you want to give them those essential building blocks. They should know their doubles, sums of ten, so that you can use what you know to solve what you don't know. It's also important for kids to really understand as we're looking at the next one, that ten plus any number, like ten plus five is 15, ten plus two is 12, and so on. That's another important fact, because if they know that, then they can solve those really difficult problems, like – how many of your kids have trouble with…? How many of your kids have trouble with those? Right? Oops, I meant to say nine plus eight. How can we use what we know about ten plusses to solve these. Okay, I can say "If I know that ten and seven is 17, nine and seven is going to be one less. If I know that eight and ten is 18, then nine and eight is going to one less, 17, okay? So we really want to use what they know. Let's not make it so complicated. But, those are things they can do up here and not, you know, having to count on their fingers. We want to move them along. This is a checklist that I designed, so if you have kids who are playing card games or dice games, and they're adding two numbers, you can put this checklist on a clipboard and as kids are playing their games, you can focus on one child at a time or two children at a time. And what this checklist represents are many different strategies that a child might use. So, for example, and to preface this, it's not always obvious what strategy a child is using. And they can sometimes count really quickly. So, I will always ask "How did you get that? Show me how you got that." Sometimes it's obvious. The first strategy – points to each symbol while counting – so that you've probably seen if you've worked with kids – young children – where they will go, if they're adding – say six and four, they'll go "1, 2, 3, 4, 5, 6, 7, 8, 9, 10." That's pointing while counting, so I would write the alga rhythm six plus four right next to the strategy they're using. Sometimes you'll see children go like this, they'll go… um? Right? Either with their eyes or they head, they won't say anything, but, you know, that's kind of like a step away from the actual having to touch each symbol, right? With that one to one. They're kind of getting there – they're starting to get there. So I would then record six plus four at looks/nods at each symbol while counting. Sometimes children will go "Oh, 4, 5, 6, 7, 8, 9, 10." Have they added to the smaller or the larger? The smaller. So, I would write six plus four on adds to the smaller. Or if they went 6, 7, 8, 9, 10, they're adding on to the larger, so I would write six plus four here. Sometimes if they use that strategy that we talked about before, a doubles plus one or minus one, that's where I write it. If it's a near doubles, like an eight plus six, take one off the eight, put it on the seven, I would write it over here. Or uses combinations that make ten. Or ten plus one or minus one, which means that if I have nine plus eight, I'm using ten minus one, which is nine, right? Or if I have a card game with eleven's in it, eleven plus seven, "Oh, I know ten plus seven is 17, so eleven is going to be one more." Sometimes see this uses other number facts? Sometimes kids will say, "I don't know why it is, I just know eight and six is fourteen. Don't ask me how, but it's in my brain. Eight and six I know is 14. And because I know that, I know that eight and seven is 15." And that happens – we have no way of explaining it, so that's a place to put that. Sometimes kids know it automatically. But don't assume that because they know it fairly automatically that they have done some real fast counting there. What you can tell from data derived from your observations is, well, things like, I'm noticing, you know, that Jose' consistently adds on to the smaller number. What can I do to support and extend that thinking. So what are some strategies that I can develop with this child to get to know those number facts. So we can zero in. So we're not sending kids home with decks of flash cards that they don't really need to be practicing. Let's have them really work on the ones that they need to work on, and zero in on those. So that's something that you can try at some point. And now we'll talk a little bit about, how do we develop a sense of place value with children? I'm sure all of you have either used cubes or have seen cubes. Well, when I work in classrooms before I put with children cubes into bunches of tens and ones, I want them to have a meaningful context to begin to think about just bundling things in tens. So I might have them do an inventory of our class library. We're going to count all of our books – maybe all of our biographies, all of our nature books, all of our non-fiction – whatever it is, but you know what we're going to do to keep track? We're going to bundle them in groups of, what do you think? Ten. We get the big rubber bands, then put them around the books, so kids are actually bundling books for a purpose. We want to inventory books in our classroom. There are lots of other things that you can think of inventorying that are meaningful for your kids. …and her students, first grade, put a cube on each of the steps, rather than trying to count, 'cause when they first tried to count them everybody had a different answer about how many steps. I thought that was a brilliant strategy. And then they took those cubes off the steps and put them in trains of ten. What a wonderful idea! So they're actually using a real problem – that's the context. So come up with a meaningful context before you just throw out these trains of ten, and these loose ones. But I do have in my classroom bins with just 10-trains, and bins with loose ones. So that when children are solving problems like 32 and 48, one of their options would be "I'm going to build a 42 with my cubes, and a 38, but it's so important for them to have that initial meaningful experience with bundling. We really want them to develop that solid understanding of unitizing. (MUSIC)