

Teacher Time: Infant/Toddler Cognition: Supporting Early Math

Teacher: Do you want that? That's a rectangle. It has four sides. See. One, two, three, four. Look, this one's a green circle. Circle. Here's a square. You want a yellow square, Sam? See. Told you. First thing. Look, here's a red triangle. Three sides. You want this one, Liv? Olivia, you want this one? Do have the green ones? Look, you have two green ones. One, two. You want the blue one? Here. You want the blue shape? You can't take the pegs out. Do you want the blue triangle? Blue triangle.

Judi Stevenson-Garcia: Hi, everyone. Welcome to "Teacher Time." This is our third infant-toddler episode of this year's "Teacher Time" series. I'm Judi Stevenson-Garcia, and joining me today is Treshawn Anderson. Hi, Treshawn.

Treshawn Anderson: Hi, Judi.

Judi: Hi. We're here from the National Center on Early Childhood Teaching and Learning. And we are excited to be here today to talk about cognitive development for infants and toddlers -- specifically emergent mathematical thinking.

Treshawn: We've heard from many of you today about supporting and how you support young children's early math learning and its importance to their overall development. And we also know that some of you may be kind of nervous and uncomfortable with math, even though you know it's good for children. But don't worry. You're probably doing more math support than you realize. And we know you've been working hard to learn about what early math learning means for infants and toddlers and what you can do to support that development. So, great job on that, and good job for being here today to learn more. As we just saw in the video, it's so important to create an environment that supports early learning, early learning of math concepts, exposing children to math concepts, and to use the language of math or "math talk," as you'll hear us say a lot today, even with the youngest babies. Using math talk helps make math concepts concrete and visible. But to do that, it's important to know about early math development so you can recognize all the opportunities you have during the day to bring math to life for infants and toddlers. And that's what this webisode is all about.

Judi: Yeah, that's right. So, it's your interest in supporting children's early math learning that motivated us to focus this episode on emergent mathematical thinking and specifically this subdomain under the infant-toddler cognition domain in the Head Start Early Learning Outcomes Framework, or the ELOF, as we like to call it. But before we dive into math, I just want to give you some information about this webinar. I see some of you are in the chatbox trying to figure out your volume. So, we're gonna try to figure that out and we're gonna be using some of the Adobe Connect features to help us interact. So, first of all, some of you ... I see lots of you are already in the chatbox. Please use that chatbox there to say hello and to add comments and to ask questions. Our friend from DTL, Jan Greenberg, is in the chat room. She's gonna be showing up in blue. There she is. Hi, Jan. So, Jan's our chat room facilitator. She'll be asking some questions. She'll be giving you some links at the end. And as we watch videos,

really, what we love to do is to kind of hang out in the chat room and talk about the videos there. So, we'd love to hear from you, what you think. If you have questions, please ask away in there. We'll be asking you questions as well. If you look right below the chatbox on the bottom left, you'll see that there's a link to our viewer's guide. That is where you can write some notes down. It summarizes all the content that we're gonna go over today, and it also gives you a list of resources that you can use after our webisode. You can download that, and you can either print it out to write in it or you can type directly into it on your computer. And then you can also see the PowerPoint for today. It's going to be there for you as well. We're going to do several videos. And as I mentioned in the chat, if you're listening on the phone, you will not be able to hear the audio of those videos over the phone. So, if you want to ... If you are on the phone but have your computer, then just mute your phone, turn on the audio of your computer speakers, and then you'll be able to hear the videos. And you also can just listen straight through your computer speakers. If for any reason you get disconnected from the webinar, just use the same link you used previously, and then you can just jump right back into the webinar. And then finally, at the end, we're going to post a link to an evaluation form, and we'd really appreciate it if you would complete the evaluation. We use this information from you to improve our future webisodes. And when you complete the evaluation, you can download a certificate of completion for your participation in the webinar. And if you're viewing the webinar with some colleagues on one computer and only one person is registered for the webinar, you can forward the evaluation link to your colleagues who also viewed the webinar, and then they can complete the evaluation and receive a certificate of completion.

So, for the series, just as a reminder, when we use the term "teacher," we're really referring to any adults who work in group care settings, teachers, and family childcare providers. We recognize that there's a wide variety in the types of learning environments for infants and toddlers. You may work in a classroom with several infants, or you may be a family childcare provider supporting infants, toddlers, and older children. So, we hope that you find the information and the strategies and the resources that we share, that you find them useful to your specific setting. So, we want the next hour to be as interactive as possible. So, please keep asking questions. Let us know what you're thinking in the chatbox, and we'll do our best to address them as we can. So, there's been some people saying that they can't hear as well. If you've called in, you should be able to hear us just fine. If you're listening on your speakers, on your computer, like Judi said, you probably won't be able to hear on the phone, you can't hear the videos, but you should be able to hear them on your speakers, and some people have noted that there's a little green speaker at the top of their computers. If you just unmute that, you should be able to hear us that way, as well. And some people are switching to calling in.

So, yeah, so we're just gonna go ahead and dig into our topic. [Static interruption] I hear a couple of people. You might want to mute your phone or your speakers. [Static]

Treshawn: Got it. [Static stops]

Judi: All right, it sounds clear now. So, we're gonna dig into our topic for today, emergent mathematical thinking. To get started, tell us in the chatbox what kinds of learning and math

learning or potential math learning do you see happening in these photos? So, if you look at the photos, tell us in the chatbox what you hear ... what you see happening in these pictures. Yes, "Some children are counting." "She's using her fingers to point and count." "Matching shapes with colors." Ooh, "Spatial awareness," with the little dangly mobile hanging down, yeah. Lots of shape counting and numbers. Sorting and matching. "One to one correspondence," that's great. I saw that, Beth. So, research tells us that early math skills predict later math skills and that early math skills may even be a better predictor of academic success in early literacy skills. Who would have thought, right? So, early math skills also help lay the foundation for future problem solving and logical thinking. So, math does quite a bit.

Infants and toddlers use math concepts and skills to make sense of their world even before they have the language to do so. So, just think, one of my old professors used to say, "One thing – one of the first baby signs that we teach infants is 'more,'" And that's language, and they pick up on that pretty quickly. Don't you think? Using math language helps infants and toddlers build their vocabulary and communicate their ideas. And this applies to children learning English, home languages, and tribal languages, although we need to be sure to communicate with families about their developing vocabulary in their home language so that we have a clear picture of all the words they know and all of the languages they're hearing and using.

And when we think about the ELOF, it describes progression for three important goals. The first is developing a sense of number and quantity, which we saw with the little girl pointing to the pictures. The second is using spatial awareness to understand objects and their movement in space. So, that can be the little girl looking up at the mobile in front of her and using matching and sorting objects or people to understand similar and different characteristics, so that's with the little child using the shape sorter there. So, you guys hit all of the points. You guys know your ELOF. Reaching goals like these lays the foundation for learning more complex math concepts and skills in the preschool years.

Treshawn: Yeah, that's right. That's really exciting, and you guys got to see ... You really identified all of the major math things that are going on in those pictures. So, to help us dive deeper into early math development, we invited Dr. Doug Clements and Crystal Day-Hess from the University of Denver Marisco Institute of Early Learning and Literacy. And they're also one of our partners at DTL. And we invited them to share some information to help us understand early math development and learning in infants and toddlers. So, as you listen, please tell us in the chatbox what you find most interesting, because this conversation to me is super exciting, so let's listen.

Crystal Day-Hess: Thanks for joining us today as we talk about infants' and toddlers' emergent math thinking. Can you tell us a little bit about how infants and toddlers develop these important math skills?

Dr. Doug Clements: Yeah, it's amazing when you see the research that infants and toddlers are very natural mathematicians. They're natural scientists, and they're natural mathematicians. The way they want to explore the world, the curiosity they have about these things, but also a quantitative sense develops really early.

Crystal: So, are these skills unique to quantitative senses or are they ... Do they apply to other areas as well?

Doug: Yeah, it's -- a lot of different skills develop very early. If I could describe one type of experiment that really has knocked people out, right? They'll take an infant, say, five to six months of age or the like, and they'll show them a picture of three objects, like three shapes or something, and then they'll switch that to a picture with different colors and different shapes and different arrangement of those three, but always three, and then another one and another one. And they call this a habituation paradigm because kids are interested in the shapes changing and the colors changing and all that. But eventually, maybe 20 or 30 exposures to different three, they get what's the infant version of bored. Their heart rate goes down, and if they've got brain scans working, they tend to go towards sleep. They look for that, and then they all of a sudden insert a picture with the same shape and the same color, but only two objects, and infants are alert. "Oh, that's different!" You know, so they're sensitive to specific kind of quantities like that at an incredibly early age.

Let's do another experiment because it's not just the number. It's also operations, meaning adding or subtracting objects. Here's a different one where they show a little stage, and they show a hand comes out of the stage and puts a puppet down. And then a screen goes up in front, a hand comes back in with a different, another puppet, puts it there, OK? so the child is naturally well, if they have a quantitative sense, they're expecting two. Unbeknownst to the child, because come from behind the screen, they take that puppet away, so there's still only one. They lower the screen, and the child is surprised. There's no other way to say it, right? They expected two, because they could keep a mental image of the one. They could add one to it – imaginistically. They don't know the numbers one or two. I'm not saying that, but they're sensitive to these numbers at a very early age. This gives us a lot to work with, with even the very youngest kids.

Judi: So, that was really helpful information. I noticed that some of you in the chatbox are saying that you can't hear the videos. If you are listening through your computer speakers, you'll want to make sure that the volume is up and that even in your taskbar for your volume, if you look at your volume taskbar, you might need to move it up for the webinar and hopefully you'll be able to hear it. If you're still having technical difficulties after that, we will have these PowerPoints to go along that highlight the main points and then you will be able to view the webinar again, including all the videos when we post it in the MyPeers space. But so for now, if ... For those of you who were listening, I'd really be interested in hearing in the chatbox if you had thoughts about what Dr. Clements said. I see Jordan said, "It's crazy to think that, at such a young age, our babies are sensitive to quantities." Right, isn't that cool? Like, they expect there to be two things, right? And then they are very surprised when they realize that there aren't two things there. I think that was that was really exciting to hear the research that happens with infants. Yeah, and I also saw another participant, Liz, say, "Math even makes babies sleepy." And that's funny to think about, in the beginning, but math can be very laborious, So, you think about math for infants and toddlers, it's not something that's very complex. It's something that we talk to them about in everyday language. It's simple counting, it's simple

numbers, similarity and differences, and that's enough for little babies to just get the early math concepts going in their brains. So, that's great that you pulled that out, Liz. So, we're gonna watch another video of Dr. Clements tell us just a little bit more about how we can support children's development of number sense, which is something a little different. So, let's watch that video.

Crystal: So, what should we know about supporting young kids' mathematical thinking and how those skills develop?

Doug: Like all early childhood teachers, we're interested in kids' development. But what's fascinating about early mathematics is it's developing, too. It's not like we should watch for sensory and motor kind of things that develop. Math is developing, too, in very interesting ways. And teachers who understand that development are just phenomenally more effective than teachers that aren't aware of that development. So, because the research is new, not all of us knew about these capabilities of young children. But it does develop, so early number develops because they're sensitive to number, and then we can start working on number. For instance, we can ... Around ... Kids are sensitive to the difference between number, but by 18 months, they learn number words, and we can start assigning those to groups of two and three and just use those words very naturally, like we would talk to kids about anything. And then by 36 months or so, kids are starting to put those words in order and everything else, and so it comes. Other things develop too. Spatial and geometric understandings develop.

So, how do those develop? When kids are very young, they've got blocks. This is the kind of action they make with them, and that's fine. But even within the infant and toddler kind of thing, eventually kids will take some blocks and start lining the same block up. But just think about that. Not only are they showing they understand the same shape and they're, in a very simple way, composing those shapes to make something, right? Not only that, but it's also the foundation for sorting and classifying, and sorting and classifying underlies all cognition, as Jean Piaget said. Those kind of abilities to sort and classify ... You need them for science, you need them for everyday social-emotional things. Sorting and classifying is a basic cognitive skill, and these kind of experiences develop that. And then, towards the end of the toddler years and everything, they will start doing other things with same-size objects, such as stacking them. This is the beginning of shape composition that goes on through the next few years.

Judi: OK, I can see in the chatbox that some of you are very excited about what Dr. Clements shared with us. It's really amazing when you stop and think about what our infant-toddlers have the capacity to learn and understand, even at a very young age. And as teachers, you have an important role to play. You bring math to life through your understanding of early math development, the materials and experiences you provide, and through nurturing and responsive interactions. So, what does that mean exactly? We're gonna take a few minutes and watch a couple videos of teachers in action. The first one will be the one we showed at the beginning of our webisode, so if you missed it at the beginning, you'll get to see it now. But even if you've got to see it at the beginning, take a look again and pay close attention to how the teacher interacts with the children. We'll also watch the second video with some toddlers.

Think about what you heard from Dr. Clements. And keep an eye out for how these teachers are supporting early math learning.

Teacher: Do you want that? That's a rectangle. It has four sides. See -- one, two, three, four. Look, this one's a green circle. Circle. Here's a square. You want a yellow square, Sam? See -- told you -- first thing. Look, here's a red triangle. Three sides. You want this one, Liv? Olivia, you want this one? Do have the green ones? Look, you have two green ones ... One, two. You want the blue one? Here -- you want the blue shape? You can't take the pegs out. Do you want the blue triangle? Blue triangle.

Teacher: Yeah, try that one. Ah, you want to try this one?

Child: Uh-oh!

Teacher: Uh-oh! You want to try the rectangle with squares?

Child: [Babbles]

Teacher: Uh-oh, you've got to make sure it stays on. How about this one? What is that? Is that the same? It's a rectangle. Yellow. You did it, and this is a triangle -- green. Ah ... ah ... ohh, you did it! Let's try a circle. Can you get it? Ah, uh-oh, you want to try again? Let's move it closer to you. There you go. Let's try this again. There you go. There you go. Yeah, almost. Ah, almost. Uh-oh, let's put it ... You want to put it next to it? You got it? [Children babble, teachers talking indistinctly] [Indistinct radio chatter] Uh-oh!

Treshawn: Those are great, I love those videos, and you guys are mentioning so many great things in the chatbox, I can't even keep up. But lots of you mention that math -- there's a lot of math talk going on, labeling of shapes and colors, using number words, and counting. Someone mentioned that you liked the way that she moved her finger around the shape as she counted. That's great, so it's identifying the concepts that are specific to shapes, but also introducing number. They have lots of math-related toys and materials in the classroom that they're using. The teachers are on eye-level, right? They're sitting right there with the kids so that they can make eye contact. They're responding to the children's interests. One of you said that that saying "try again" is a math term. And I think that's fantastic. I hadn't even thought of that as being a math term, but it is, right? Because there are lots of challenges that we encounter with mathematics that require us to try again, right? "This was not a good solution. Let's try a different one." I love that you mentioned that. And I think the positive affect, right? Some of you mentioned that they're cheerful, they're happy, they're encouraging, and one of the things that I noticed that I thought was interesting in that first video was one of the babies had put a shape in her mouth, right? And sometimes we ... I know that we might be concerned about babies mouthing toys, but that's actually one way that they learn about their environment. So, she's actually learning something about the shape of a square by putting it in her mouth. And that's gonna make a connection for her later on. So, great comments, you guys. You really saw a lot of what was going on there. Liz, yeah, definitely scaffolding and problem solving, exactly.

Judi: And Francine mentioned that the teachers are being very descriptive, and I think that's almost the simplest term we can use for this. If you can just describe the toys that the children are playing with – the size, the shapes, the colors. If you're explaining it to someone that couldn't see, just being descriptive is also using the math talk and those math words, so I think it's great that you pulled something that simple out. Since we've already started identifying and talking about effective teaching practices that support early math learning for infants and toddlers, we invited Dr. Clements to come back again and share some of his ideas for helpful strategies. So, as you listen and hopefully you can hear this time, tell us in the chatbox what strategies you hear that would be helpful with the children that you work with.

Crystal: So, Dr. Clements, you've talked to us about how we can support children's learning, the types of things we need to know about their development of these math skills. How can we set up our environment to support this learning in a way that makes sense for young kids?

Doug: Yeah, there are so many things in the environment that are math related. But if teachers don't think about them, then setting up the environment and using the environment, changing the environment, and then talking about the environment in that way won't be quite as rich. So, think of an environment. What's some area we can talk about? What would you think about?

Crystal: Let's talk about the play area in the infant-toddler room where we have all of these great materials that we have access to. So, we have our foam blocks or shapes sorters. What could we do with some of those materials?

Doug: Yeah, so these things are fantastic for ... And kids can combine one kind of thing with another. We don't have to keep them all as separated and things like that. But just adding things, adding a new shape to it or something, or setting something up where you create something that looks like this and is kind of tenuous and falling down or something like that – just setting it up when the kids come in a slightly different way and then talking to them about why that fell down or didn't fall down or something like that already is a good way to keep that kind of thing going. What else? What other areas would you think of?

Crystal: Yes, we know in all classrooms, routines are key to supporting all kinds of areas of development for young kids. How can we incorporate math into routines within infant-toddler classrooms?

Doug: Yeah, so hopefully, people already involve even kids as young as that in putting things away and the like. But clear pictures on things or silhouettes for blocks or whatever you use as an organizing principle really gets to classifying and even seriating because we could put things in order or the like, but classifying and sorting and that is done by putting all this type of toy over here, putting all that type of toy in a different place and the like. So, labels on things, pictorial labels, and things like that are gonna help the classification and separation kind of things come in as kids are also talking about shape and as teachers might throw a little number thing – say, "There's still two more blocks over there. Can you get those?" instead of "Can you pick up those blocks?" That makes a huge difference. You don't have to take time away and say,

"Now we're gonna learn about the No. 2." When you're teaching very young children, though, if you can get in the habit of always saying, "There's two blocks over there," rather than, "Get those blocks over there," it makes a huge difference to kids. Families, too, talking to them about this kind of stuff in their environments at home, similarly setting it up so that kids put things away with a sorting and classifying kind of orientation, but also using those kind of number words at home.

One interesting study from the University of Chicago showed that some households, when they studied the households, within them, young – very young children, might hear about 1,500 number words a year. That sounds like an incredible number until you hear that at the other end, other kids were hearing up to 93,000 number words a year. If we can just encourage families, parents, other siblings, and everything else to use those number words, that's 60 times as many number words a kid hears every year before school. So, working with parents to talk about these kind of informal experiences is also really helpful for the environment at home as well as school.

Judi: I see a lot of you in the chatbox are inspired by Dr. Clements to start using more math language in your day. I think that's great. We take for granted sometimes that we ... What we understand about seeing two things or three things, and if we can bring that language out. Some of you mentioned ... Liz mentioned "half, full, empty." Someone said -- oh, where is it? Mealtime -- Oh, that's Liz again. Mealtime ... Someone ... I can't find it Someone mentioned scoops, like ... Oh, here it is. Rebecca – "How many scoops should we start with today?" I think that's fantastic. Like, "OK, let's put three scoops in," or one scoop or whatever it is, whatever you're making, I think is a great way to build that language in. So, we're gonna listen to one more video with Dr. Clements, and he's gonna share with us just how to make sure that we are individualizing our supports to meet the needs of all of the children that we work with. So, again, keep that chat room going. Please tell us about any strategies you hear that you think will work for the children in your care.

Crystal: So, all of the practices that you've told us about today seem like they can be really beneficial for supporting all children in the classroom. Are there any other considerations that we should keep in mind for children with suspected delays or identified disabilities?

Doug: Oh, that's so important, yeah, because I think the practices tend to be the same, but you've got to be especially attentive. So, if the child has language delays or the like, they just might need more repetition of that, especially with guidance physically, or support physically, but guidance physically and then visually. So, they're tying that kind of, movement that they make and visual experiences that they're having to the language. And then they might need a lot more support in terms of hearing those vocabulary words or whatever you're working with again and again and again. So, if you do it in different voices or a cute way or you make a singsongy song out of it, or you're just aware – "During this week, I'm gonna really attend that, with this child, I'm gonna make sure I repeat these words several times every single day because they need that kind of extra support." Asking family members and others who work with the child and have the child at home are also really good ideas because they will be ... You

want to be in sync with them and they may have other ideas of how to offer those kind of supports to those kids with special needs.

Crystal: Great, and thinking about children who are dual-language learners, how can we support those children and leverage their unique home experiences in teaching different math concepts and skills?

Doug: Yeah, children with dual language learners. People call it "funds of knowledge." It's a great kind of concept, right? And that is that every household has lots of experiences and things they do with mathematics, with science, with STEM – science, technology, engineering, and mathematics that if we get to know what they're doing at home and we bring those into the classrooms, this can make the child much more familiar with the things, much more comfortable with the ideas we're trying to introduce. The worst that happens then with kids, especially the younger they are, is that they see a divide between the kind of language and ideas they use at school and at home. We want those connections to be strong. So, if you can use some ... If you have Spanish-speaking kids, if you can use some Spanish cognates, where some language in their home language could be used as a duplicate to the English term, when we're talking about those things in schools, simple number words, simple shape words, or whatever they be, that can be really helpful as well. But also make sure that with those kids, you might pull kids who have a dual language aside and do especially visually motor-based sensory kind of experiences, providing those new vocabulary words just to those kids before you do, then, like a whole-group activity where those are introduced. That give those kids an inroad into those concepts that will really help them understand then when you're talking to the whole group.

Judi: So, less of you had thoughts and comments there about this video. Dr. Clements is definitely inspiring and creating some light bulbs that are going off. I just want to make sure ... I see lots of you are saying, "Oh, labeling is a really good idea," and labeling is a fantastic opportunity to provide supports for your young children. You want to make sure that you're using pictures. And if you combine them with words, that's really helpful, too. It starts to help them understand that the symbols go together with the pictures that they're describing. So, that's great. Thank you, guys, for your comments there. Oh, and there we are. So, we're gonna watch a couple more videos of teachers using some of the strategies that Dr. Doug Clements shared. And so, as you watch, see if you can pick up on some of the strategies that you observe, the teachers using that Dr. Clements highlighted. So, let's watch. [Video begins] [Indistinct conversations]

Teacher: One, two, three blueberries for you.

Teacher #2: One for you. Sela, you like the bananas? See? Bananas? Yeah? Si, te gusta la banana? Banana. Uno, dos, tres.

Teacher: It's going back, and the little one's coming in. [Soft music plays] One, two little animals. Two little animals jumping high, jumping down low. This one's coming close, and this one's coming close, and now they go far, far, far. Oh, no, where are they going? [Gasps] They're

gonna jump up and down. Up and down. Now they're gonna run fast, fast, fast, fast. And they're going to come back slow. And then they run fast, fast, fast, fast. And then slow. And then here comes the big elephant. The big elephant says, "No, stop running so fast. Go slow, like this." Slow, fast, fast, fast, no, no, no, slow. "You must go slow. They come back, and the little elephant comes back, too, and now there are one, two, and three animals. But then the little monkey says, "I want to come in, too. I want to come right in between you two." There's one, two, and three.

Judi: This is great. You guys had a lot to say about these videos, and these are some of my favorite videos, I'll have to tell you. So, thinking about the first video with the two teachers passing out snack, you guys notice that they were counting out the snack. Some people even said that's a mandatory, that's a must in their classroom, so that's great. And some of you even noticed that one teacher was using the child's home language to feed her child, to feed the child and put the snack on the table. So, that's also a great way to really help the child feel comfortable about using math language, even in their own home language. And the second video, wasn't the teacher just so responsive and caring and just sweet? Like, I want her to be my teacher when I was an infant. But some of you guys pulled out things that she was saying using size comparison – big elephant and small elephant and small animals. She did some spatial relationships. She did some spatial relationships and recognizing, so moving the animals close to them and moving them further back away from them was also great. And someone even ... I didn't even pull this one out, but someone even said that she made a story out of this whole spatial vocabulary. And so, instead of just sitting there staying "close" and "far" and "near" and "under" and "over" and doing things that are kind of remote and routine, she really created a story to bring those concepts to life for the children, so that's awesome that you guys pulled that out of this.

Some other strategies that I saw with these videos are the teachers' warm interactions with the children. That really created a solid, comfortable space for the children to really explore these concepts. The teachers used a lot of math talk and vocabulary, but like we said, they used it within the context of a story or a routine that they were doing, like snack. The teachers used routines like snacktime and free play experiences and used the materials that they had right in their classroom to support early math learning so they didn't have to go out and get something new and different. They used songs. They used counting while they were serving snack. They used the toys in the classroom to compare big and small animals. So, that's really great, and then, like we said before, that one teacher used the child's home language to count out her snack, and that's such a great way to make children feel comfortable with math in their home language, both at school and at home.

Treshawn: Somebody was asking -- sorry, some people are asking where we can find these videos. Well, this whole entire webinar ... webisode will be posted on MyPeers, so you get access to the entire webinar, and then you can see these videos again. Especially if you can't hear, I advise you to sign up for MyPeers so that you can see the videos and hear them.

Judi: Yeah, we'll give you information at the end if you're not already on MyPeers and our Teacher Time group so that you can sign up and register for MyPeers. It's perfectly free and available for everyone. It's our little online community where we get to chat about all of the things that are happening with us and the children that we work with. And this is a great transition, actually, into thinking about the context for all of this learning. So, it's really the consistent, positive relationships that you develop with your children, but in terms of the way that you set up your environment, the learning experiences that you provide, and the math talk that you use with infants and toddlers, this is really what helps them learn early math concepts and skills, and then to begin using those concepts. I mean, if you see an infant banging two blocks together, right? That's building some math learning already, and they're starting to understand number concepts just by giving them those materials in their environment. And as a part of young children's explorations, they focus on and pay attention to what's around them. Like, did you see those babies? They were so focused, those tummy time babies. They were watching that story, they were watching those animals, they were trying to touch the animals, and this kind of engagement helps them to learn to persist as they counter -- as they encounter challenges in their explorations. Like, if you remember the little baby who was trying to build the block tower, right? And as soon as it fell down, the teacher was like, "Oh, no! All right, well, let's try another one." So, that baby is learning to persist, which, as someone mentioned, "try again" is so important in terms of supporting math, curiosity, initiative, and this is what leads children to new discoveries.

So, when you provide interesting environments and materials and as many of you are mentioning, even materials at home, everyday materials can be really interesting for children to play with. You can plan interesting experiences and take advantage of those teachable moments and use the math language to help children make sense of the world. You give them the tools that they need to engage in their learning. All of these things, this context for learning, the things that enabled children to really engage and be curious it's related to another domain in the ELOF called Approaches to Learning, and that domain is really about how children learn, rather than what they learn. So, this domain includes cognitive self-regulation, initiative, curiosity – the things that you saw these teachers supporting in these videos. And by applying these skills, children learn new skills, and they set new goals, and then they get to meet them, and they learn to do things that are challenging or maybe frustrating or something that just might take time to accomplish.

So, we're gonna watch one more video of a teacher. And now think about approaches to learning and watch how she engages with two toddlers playing with a shape sorter. As you watch, tells us in the chatbox, what strategies do you observe that support children's learning and development and approaches to learning and an emergent mathematical thinking. So, let's watch.

Teacher: This one is a rectangle.

Child: [Speaks indistinctly]

Teacher: This one's a triangle. [Children babble, teachers talking indistinctly] You have to find the one that matches that. Hmm, there's the triangle. Where is the other triangle?

Teacher #2: Let's go around, go around. Feet on the floor. There you go.

Teacher #1: Check on this.

Teacher #2: Go all the way around.

Teacher #1: That's right. Hold on, wait, let him try to find ... Try and turn it. Almost. You have to ... Can you turn it a little bit, make it flip in? Line it up exactly so it fits. Turn a little bit. Yeah. Very good. You have the rectangle. You want to try to find the rectangle. What? That one's the parallelogram. That one's kind of hard.

Judi: Yeah, so this teacher was always labeling what the child was trying to put into it, and she did ... Stephanie, you're exactly ... I was just gonna say that. She provided so much encouragement to that child. He was really trying to get that triangle into the spot, and she was really patient with him. A lot of you guys said that, too. So, she really provided a safe environment and nurturing environment for this child, and all of this helps children approach learning in a really positive way. And when you support children's initiative and their curiosity by demonstrating your own interest, children learn that it's OK to be curious and to trust their interest and abilities to explore their environment. And when you notice children are interested in something like knowing the names of shapes and fitting them into a shape sorter and helping them sustain their interest through your patience. Someone said patience was the key there.

Attention and language. Children learn that attention and persistence really does pay off as they learn about things that they're interested in. And so, did you notice in the video when the teacher helped the child to persist by telling him to turn the shape and turn it the other way? And even grabbed it back a little bit from the other little boy that wanted to explore it, to really help that child persist and get it in, get that reward of getting it into the hole. So, and she didn't really just do it for him. She really was patient with him and encouraged him to do it on his own. And that's really showing patience in what the child is interested in doing. A family's values, beliefs, and cultural practices also affect how children approach and engage in learning. So, it's important to find out from the family members how children explore their environment at home, like what are they allowed to do, and how do they approach new and unfamiliar things or experiences? Do they allow children to take risks at home? Do they prefer to observe? You know, do children prefer to observe before doing something? And also, what language or languages do they speak at home? And how is language used? And what do the children already know and enjoy in the languages that they hear at home? So, building that connection with the families can really help bridge that gap from home to school, learning about math concepts. And knowing what families value in terms of approaches to learning will help you understand the children you work with better so that you can better meet their needs.

Treshawn: So, that's great. I was gonna say, so we had some comments here about all of this is within the context of nurturing relationships, right? And that's really the key, is this student or

the child trusted his teacher to help him, and she was so patient with him, that he was able to be successful. And I think sometimes that's something we forget that the patience and allowing him to struggle – sometimes we want to solve their problems for them and say, "Oh, it goes right here," but to let him struggle, he's learning through that struggle, and I think that that's really important. Yeah, Francine said the children felt safe while exploring the blocks. That's exactly what it is, and that's approaches to learning right there. And that builds his learning – I mean, right there in that situation.

Judi: Did you want to say anything else, Treshawn? I know you always have –

Treshawn: No, that was it. Now I'm just thinking about ongoing assessments and how we can intentionally observe and document growth that we see happening, so we can push the PowerPoint for that, and so ...

Judi: Yeah, we'll spend the last few minutes today talking about assessment, and actually, I think that's key because if you look at that teacher, like, she knows something already about that child and what his skills are. And as you mentioned here, it these consistent, responsive relationships that are gonna help infants and toddlers. And so, when you have that kind of relationship, you really get to know where they are and where their skill level is. The other thing that was happening there was that she was being very observant, right? So, part of her patience was observing, right? What is he ... Is he getting too frustrated? Is he getting to the point where I need to kind of intervene and help him out? Or is his struggle still OK, right? So, we can observe and document what children are doing and the growth in their skills. Eventually, he's gonna go up to that shape sorter and put every block in without a challenge. At some point, he'll get there. And I think if we want to make sure that we have that focused observation and intentional engagement and then also we want to make sure that we have two-way communication ... Treshawn, you mentioned this, about establishing relationships with families so we know what their experiences are with math concepts at home and we know what families value in terms of approaches to children's learning, too. Do we jump in right away and solve our kids' problems, or are we more laid-back and let children struggle, you know, and then kind of jump in when they express that they're being frustrated?

And we also know – Dr. Clements mentioned, that children may know and use different words at home than they do in their group care settings. So, they may have words in a home language, or they may only have words in English that they don't have in their home language, especially math-related words, so it's really important to understand and to learn from families what children know and can do at home so that we really have a good picture of the whole child. So, we're gonna just take a minute to talk about how you collect ongoing assessment data to help you individualize your strategies to support children's emergent mathematical thinking.

So, if you think about how ongoing assessment informs your practice, could you just share with us in the chatbox what you do in terms of assessment and understanding children's growth and development in mathematics so that you can be a better support for them as they learn? What are some ways that infants and toddlers show an understanding of early math? We've seen lots of examples today of some really early math understanding. So, how do you know when a child

is showing you something that they know in terms of their math? Just tell us in the chatbox if you have some ideas about what you look for. Oh, you use CORE ... Jessica says she's used the CORE assessments. So, that's gonna be a guide that will give you some indicators for what to look for. Tiffany says, "Have a positive relationship with the families because they are the child's first teachers". Definitely. Oh, "Math learning happens where families encourage children to be in the kitchen." Yes, it's so true. There's so much math learning that happens in the kitchen. This is great. "When they begin to stack or line up items one by one," yep.

Treshawn: I like how Ashley said that ongoing assessments helped her individualize her instructions for each kid, so that's great, to know that you're using it – ongoing assessments in your practices as well to inform your practices.

Judi: Yeah, even young infants – Donna says, "Even young infants and toddlers show math awareness." We should be looking for that, right? And some of you have said, "Oh, I didn't even think, that this was an infant expressing interest in math. But now maybe you have some ideas about some things that you can observe for. So, some other important points to make about ... Sorry, I forwarded one too far. Some other important things that we want to remember in terms of assessing infants and toddlers is, as someone mentioned, or several of you have mentioned, you use teaching strategies, we use ongoing assessment. This is gonna be the foundation for planning interactions and learning experiences. And your documentation is key. So, what are we noticing about children that's new or important, but something that's happening that we haven't seen them do before so we can understand how they're developing and using ongoing assessment as a way to engage with the families about their children's development. Somebody mentioned that that relationship with the families is key, right, to really understanding what they see every day, and does it coincide with what you see on a daily basis? And remember to ask your families about what happens during routines like meals or diapering, getting dressed. You know, think about the spatial skills that are required for a toddler to get dressed – putting both feet in the pants in the right way. Bath time is a great time to think about math concepts, explore volume. Some of you mentioned at the beginning pouring and emptying and scooping and also playing with siblings or other children, doing the laundry, visiting family and friends.

Once you talk to parents about the ways that they can explore and use math language during everyday activities you really might see a light bulb go off with them in terms of what they share about what their children know and are able to do. And they can also just help us understand and fill in the gaps in terms of what we observe and may not understand. So, you get to say "I noticed this today. Is this something that you've noticed or is this something new?" And then obviously, sharing with others is what you really want to be doing, so not just with families, but anyone else who might be working with this child. If you have a co-teacher to make sure that you're communicating with each other about what you're observing. And it's really gonna be an opportunity for you to grow your children's knowledge and understanding and provide them with new and interesting materials, if you can, so that they can continue exploring, exploring in that safe environment. So, Treshawn, I don't know if you've been looking in the chatbox to see people's comments. I lost track of the chatbox for a minute.

Treshawn: Yeah, people have just been sharing the tools that they use, like the ASQ and the DECA and the Teacher Strategies Gold, IDBIs. I love to see just this assortment of assessment tools that you're using, because we all know that just one form of assessment isn't the end-all be-all and isn't the one thing that tells about children. I love that you guys are using lots of different strategies to help see particular or different pieces of children's development. So, it's great that you're using these to inform your curriculum and development.

Judi: And Cynthia mentioned that – she said, "Laying out the material with a clear idea of what I'm looking for, modeling how to use the material and then making notes and pictures on how they use materials." I mean, that is like a plan, right? Like, "I want to figure out, so here's my materials. What am I ... How am I gonna model this for the kids? And then what am I gonna look for as they start to interact with the materials?" I mean, that to me, sounds like a really focused way to both engage with children in a meaningful way, but then also to gather some important information, because you've already thought ahead, like, "What would I be looking for? What am I expecting as the children play with these materials?" Make sure it's age-appropriate, yeah. Documentation is key, right? What we remember. Do you remember what happened yesterday? I don't remember what happened yesterday, especially when you have these nuanced skills that kids are starting to show. You really want to make sure that you're making notes of the things that you observe. The documentation is definitely key.

Treshawn: Yeah.

Judi: Oh, go ahead.

Treshawn: No, I was gonna say, Savani says, "Using their children's work samples and pictures and anecdotal notes." I love real-life examples of how my children are developing. When I get pictures from my children's teachers or pieces of art, drawing that says what standard this was matching, or that really helps me know that what they're doing in class is really helpful and informing their development and the teachers are being intentional about whatever strategy that they're using. So, that's a great thing – using children's work as a form of documentation and assessment, which is great.

Judi: Yeah, and I see Liz mentioned that she uses Learning Genie, and I'm gonna assume that that's gonna be like an online or a web or an app for sharing information, but I would love it, Liz, if you're in our Teacher Time community on MyPeers, that that may be a great place for you to come on and tell people more about how you learn, how you use Learning Genie. And I would love to hear – if you would share – if you share math-related information with families. I get something from my son's childcare center, and it's usually a general thing, like, "Here's something we did today." But I love it when they give me really focused ones that show that he's developing a specific skill or has learned to do something new. Oh, with an app to support the RDP. Oh, that's really cool. All right, well, I want to find out more about that, so maybe we can have a chat about that in MyPeers. And speaking of MyPeers, I want to make sure we have just a few minutes to give you guys some resources. So, most exciting is we have effective practice guides up on ECLKC, and one of them is all about cognition. So, please go to the ECLKC, and you can look up effective practice guides and Janet ... Oh, Jan's giving you the link. So, if

you can't find it, she's giving you the direct link in the chatbox. And this link is also in the viewer's guide as well. So, that is a fabulous place. It's gonna give you more videos. You'll get to think about the teaching practices behind supporting cognition. You'll get to see videos, and then you'll have a chance to think about your own practice and revisit your own practice so that the effective practice guides, if you haven't seen them, are fabulous resources, and cognition is up on ECLKC.

The other thing that I want to mention is the ELOF2GO. If you still don't have it on your phone, it's an app that's available for free. you can download on your phone. It also gives you access to teaching practices that support the cognition domain, all the domains. But specifically, if you're interested in learning more about the cognition domain, especially for infants and toddlers, you can download that app and there's additional resources on the ELOF2GO. Text4Teachers. If you don't know about Text4Teachers, it's a texting program where a couple of times a month you get sent links from DTL about interesting things, links to resources and information about a variety of topics. It's just another great way to stay connected.

And then finally, MyPeers, for those of you who don't know and haven't been there yet, MyPeers is a free online community for Head Start and childcare providers. And we have our own Teacher Time community. We would love for you to join, and we post resources there. There's conversations there. We also will be posting this webisode there for you to watch again or to share with others. So, if you ... And I think Jan ... Yep, Jan posted the link. If you click on that link, it'll give you directions to join MyPeers. And again, as I said, it's free, and then once you join the MyPeers community, you can join our Teachers Time community specifically. So, we really hope that you join us there for that.

Treshawn: And Chastity, it looks like Chastity tried to download the ELOF2GO on their iPads at their school, which is great. What I noticed when you're searching for ELOF2GO is that you have to separate like "ELOF 2 GO." So, it's not all together as it looks on here. So, if you try searching for it that way, it should come up because I put it on my phone a couple of weeks ago.

Judi: So, thanks, everyone.