Office of Head Start - Where’s the Math Webcast

(links for viewing and download at end of transcript)

[Music]

Pat Brown: Welcome to the first webcast in our six-part series on early childhood math. My name is Pat Brown and I'm the acting director of the Office of Head Start. It is my pleasure to be here today as we begin to answer some very important questions. The first is so important, it is the title of this webcast. The question is, "Where is the math?", but before we explore "Where is the math?", we need to discuss, "Why math?"

Why is mathematics important to Head Start directors, managers, leaders, teachers, home visitors and children? A little bit of Head Start history can help us find the answer. First, it is part of the law. In 1998, Congress passed a reauthorization of the Head Start Act. In it, they mandated improvements in language, literacy and numeracy. Numeracy is mentioned specifically, and is part of the broader term, "mathematics."

Shortly after the reauthorization, we released the Head Start Child Outcomes Framework because we recognized that we needed to help children develop across all domains of learning. So the Child Outcomes Framework not only includes language, literacy and numeracy, but it also includes a more comprehensive definition of early math as well as each of the other domains. In recent years, both the Office of Head Start and you have done substantial work in the first two areas identified in the reauthorization.

We have worked together to help teachers become more intentional about what they were doing in the areas of early literacy and language development, and our work is proving effective. Research has shown improvements in both children's performance on language and literacy tasks as well as in measures of the classroom environment.

Yet, the Head Start impact study found that while Head Start had significant impacts on literacy and language, there was no significant impact only early math skills. Mathematics is extremely important to children their future success. We know children's early math experiences and vocabulary impact their later learning.

In fact, a few poor experiences at early age often lead to school failure in later grades. These are the reasons why we're now turning our attention to helping program staff be more knowledgeable about the subject of math. To that end, there's an important and exciting new word you would be hearing throughout the webcast series. The word is "mathematize". It means to draw out or call attention to the math content and processes in children's experiences.

As the personnel that support teaching teams, we are here today to learn how we can teach our teachers to "mathematize" experiences and be more intentional in supporting children's math learning. When this happens, the experiences will have more impact and be more interesting and enjoyable for teachers and children.

Through this work, we believe Head Start will improve child outcomes in early math and the related domains. So how will we accomplish these goals? Here to explain more, I'm pleased to introduce Amanda Bryans, the acting director of the Educational Development and Partnership Division of the Office of Head Start. Amanda?

Amanda Bryans: Thank you, Pat. And thank you to all of our education managers, supervisors, directors, curriculum specialists, mentor-coaches and T and TA staff for taking the time to be with us today and learn how we can help Head Start teaching teams provide quality math experiences for all Head Start children. As Pat mentioned, this webcast is just the beginning of a six-part content-rich series on early childhood mathematics. In turn, the series is just one part of a comprehensive math focus initiative for Head Start.

As part of the initiative, we're currently working in collaboration with the Sonoma State University to provide training and technical assistance for both the staff and parents in the area of early math. Additionally, throughout the year, we

will post math-related information and resources on our electronic learning center, the Early Childhood Learning and Knowledge Center, also known as the ECLKC.

And in fact, you should have already visited the ECLKC to download and read the supplementary content for today's webcast. If you haven't, we encourage you to do so after our presentation. Some of the information we'll be sharing today is not new. In fact, you'll find many examples of what you already see in Head Start classrooms and centers. The child outcomes are also not new -- you'll recognize the elements in the mathematics domain as well as in many of the other domains in the Outcomes Framework.

What is new is our focus and determination. We believe that teachers don't always see the opportunities for "mathematizing" learning, and are simply not always aware of the specific outcomes that will help children become math learners. The primary focus of today's webcast is to provide an introduction to early math, and an awareness of the many opportunities for math learning in the classroom.

Our expectation is that you will use this content to provide in-service training and help those you work with answer the question, "Where is the math?" To help us lead the way, the Office of Head Start has contracted with Dr. Juanita Copley as an early childhood math advisor for this year. Dr. Copley is a national known expert in the field of early childhood math and education, and professor at University of Houston.

Among her accomplishments, Dr. Copley has served as chair of the Department of Curriculum and Instruction, and was the director of Teacher Education. She also worked on the position statement issued jointly by the National Council of Teachers of Mathematics and the National Association for the Education of Young Children on the importance of high quality, accessible and challenging mathematics. We are so happy to have Juanita here with us today and as we move forward with our math initiative.

Before I turn things over to her, I would like to remind you that the final part of today's webcast will feature a live question and answer session. We encourage you to take advantage of the opportunity to ask questions about today's content. There are three ways you can do this. Throughout the webcast, you may type a question or comment into the field you see on your viewing screen. And don't worry, submitting a question will not take you to another website or away from today's webcast.

The second way to submit your question is by calling the toll-free number posted on your viewing screen. The phone lines will open in approximately one hour at 3:00 p.m. eastern time. Or you may also fax questions to the number on the screen.

We will continue to post our contact information throughout today's webcast. When you submit a question, please include your first name and where you are calling from. Today's questions not answered will be posted on the ECLKC, along with an archive of this webcast. Now, its time to get back to the important question: Where's the math? Juanita?

Dr. Juanita Copley: Thank you Amanda. Welcome again to the first webcast, in a six part series. As Amanda said, my name is Juanita Copley, and I'm a professor in Early Childhood at the University of Houston. First I would like to say how excited I am to be working with the Office of Head Start, and an excellent team of specialists as we talk about mathematics for young children.

I particularly want to thank all of you who have helped me identify the needs of Head Start teachers as we begin this series, and I hope to hear much more from each of you as we continue to learn together. As part of my role as a professor of early childhood, I spend much of my time in the classrooms with young children, teaching and observing them, and working with their teachers. Let me introduce you to some of those preschool teachers.

Let's listen to what they say about mathematics, both about their experiences as learners, as well as their teaching experiences.

[Video begins] Preschool Teacher 1: My teacher as always was very strict, and I went to a parochial school so it was a nun and there was no play time, it was just dittos and, "Do this, or else you're going to be in trouble." And there was

no smiling, or no, no type of enjoyment while you were learning.

Preschool Teacher 2: I remember when I was second-year, second grade, I remember the word problems and I had a very hard time with the word problems. And now that I'm an adult and I'm a teacher, it would be a lot easy for me if I would just materials, to be doing, to result, to word problems because I didn't understand if I was going to add or I was going to subtract or multiply, because, I mean, I needed something to have in my hands so my mind or my brain can understand what I was supposed to be.

Preschool Teacher 3: See, I remember not liking that at all, and I didn't do very well in math. In fact, I think that's why I have a love of math for pre-k. It's because, "Wait a minute, if I can give these kids a foundation, you know, that I didn't have, maybe when they go on to do math throughout their entire school year, that they can be more successful."

Dr. Copley: I would imagine that these teachers are not the only ones who have had these experiences. In my work with Head Start and preschool teachers, I've heard many comments about mathematics. A few interesting ones are, "I teach them to count one to ten. I think that's it. "Really, we are too busy working with literacy. There really isn't time." Or, "Mathematics is counting, the four shapes, and A-B patterns, you know, red blue, red blue, red blue."

Or, "I never liked math in school." And, "Isn't it really too hard for our children?" Unfortunately these statements are indicative of what many teachers think about when they hear the words "math" and "young children" in the same sentence. Hopefully, the information provided to you during this series will change some of those ideas, and offer many opportunities to facilitate mathematical learning.

So let's get started. Each of the webcasts in this series will be geared around the same three questions. Those three questions are: "what?", "how?", and "what else?" I will attempt to answer the first two questions with research results, video clips of young children, photos, and children's work samples. To answer the third question, "What else?", each of you will play an important role. We will discuss the third question together during our live Q and A, and the input you provide will help shape each subsequent webcast in our series.

So let's take a closer look at today's webcast. In the first part, we will answer the "what?" question. What is mathematical learning from a broad view perspective? In part two, we will discuss how to facilitate young children's mathematics learning from a general perspective in this session, and then more specifically in subsequent sessions. Finally, in part three you will have an opportunity to ask some of your questions.

You may submit your questions by phone, fax, or by using the question field on your viewing screen. Now, let's start with a question for you. Where's the math? The next five slides are photos of young children in familiar settings. Please view them carefully and identify any possible math experiences you see. Keep in mind that we will review these later. Let's take a look at the photos.

[Music]

I know you were able to identify possible math experiences in the pictures you saw. Remember, you will see them again. Let's begin part one with a definition of mathematics learning. In the book, "Adding It Up: Helping Children Learn Mathematics", the National Research Council defined mathematics learning with five strands: procedural fluency, conceptual understanding, strategic competence, reasoning adaptions, and productive dispositions.

These five ideas are called strands, because each one is a part of a rope of learning with each individual strand being intertwined with the others. These are not listed in order of importance. Rather, they are all necessary if children experience math successfully.

The first strand, procedural fluency, is the one that is usually thought of as mathematics. It involves counting, adding numbers with regrouping, or simple computational skills. To best illustrate procedural fluency, listen to a group of three and four year-olds, practicing their verbal counting skills from one to five.

Dr. Copley: My favorite number is this. Anybody know what -- what number is this? Children: Five.

Dr. Copley: You already know that number, huh? Would you give me five? Everybody hold up five and give the person next to you five. Give them five. Five. Five fingers. Five fingers. Five fingers. Oh, yah, that's my favorite number. Here's what I want to do, we're going to play games today all day with five. Take your hand and put them on your legs, ready? We're going to go: Dr. Copley and children: One, two, three, four five. Wooooo!

That's because that five is a neat number. Let's try again. Dr. Copley and children: One, two, three, four five. Wooooo! Dr. Copley: Okay. One more time. Dr. Copley and children: One, two, three, four five. Wooooo! Dr. Copley: Okay, now this, that's the easy part.

We're going to do another one, you ready? hold your hands up really high. We'll go: Dr. Copley and children: One, two, three, four, five. Dr. Copley: Okay let's try again. Dr. Copley and children: One, two, three, four, five. Dr. Copley: One more time and then I've got something special to show you. Okay?

Dr. Copley and children: One, two, three, four, five. Dr. Copley: Now, here's what we're going to do, we're going to whisper every number except for five! We're going to do that one really loud. Okay. You ready, whisper everything, but when we get to five, you're going to go, you're going to say this loud as you can. Okay? Dr. Copley and children: One, two, three, four, five.

Dr. Copley: Wow, my goodness that scared me to death, but that's my special number right? Okay, we're going to try again. Ready? Remember, whisper, when you get to five, you know what to do. Right? Here we go. Dr. Copley and children: One...

In this circle activity children were practicing both their verbal skills -- that is, knowing the sequence of numbers one to five and counting using one-to-one correspondence as they moved their hands each time they named a number. They were simply beginning to develop procedural fluency in counting.

The next strand deals with conceptual understanding. Sometimes people say that they learned math procedures but never understood the mathematics. In fact, you might remember the phrase, "Invert and multiply and don't ask the reason why" when you were taught to divide fractions. Possibly you remember hearing, "Just do it this way. You don't need to know why." Understanding math concepts is critical to successful mathematics learning.

For example, knowing how to count to one hundred does not insure you understand the quantity "one hundred" or what one hundred means. Let me illustrate with a story. We were going on a visit to some friends' house. They had a little boy named Kyle. Kyle was about three or four, I believe, and his parents were very proud of him and they wanted to show off to Miss Nita how well he knew numbers. Kyle simply started counting, and he counted very, very well.

He counted in this way, probably typically, in a way that you would realize -- he simply took a big deep breath and went "one, two, three, four, five, six, seven, eight, nine, ten" and kept going on and on and on. Actually he did a very nice job, he had memorized that list of numbers. When he got to 100, he was very proud. I then said to Kyle, "Kyle, could you put five pennies in Miss Nita's hand?" He went and took a deep breath and looked at me and went, "Five, six, seven, eight, nine" and he was able to again count.

But he did not know how to put five pennies in my hand. You see, he had the procedural fluency or the verbal memory to say those numbers, but did not really understand quantity and know how many was in "five". Conceptual understanding is difficult to define. I particularly like a definition from a book published by the National Council of Teachers of Mathematics. Quote, "We understand something if we see how it is related or connected to other things we know."

So, making connections seems to be a critical piece for conceptual understanding. But how are those connections made? It would be nice if young children made these connections in a linear order, so once a child understood one idea, then we could go to the next in the sequence and the next and so on. But children just don't learn that way. Instead, they often make connections in a seemingly random manner, like a net of ideas. This makes me think of three-

year-old, Harry.

We had been working with him for a long time about patterns, and we had done it in a whole lot of different ways. We were doing basically color patterns. We had done his shirt, we had made a shirt, we had done weavings and pictures and we were basically doing blue green, blue green, blue green, blue green patterns and no matter what we asked Harry, no matter what the pattern was, his answer was always to the question, "What comes next?" was always, "Blue."

And when I asked him why, he said, "Because it is my favorite color" -- a very logical answer. About three weeks later, after we had done just a lot of work and we basically said, "That was fine, Harry", we were walking in a -- on a field trip and I found Harry jumping on some tiles on the floor, that were colored. And they were green yellow, green yellow.

And I looked at him and said, "Harry, what are you doing?" He said, "I'm doing that pattern stuff. It is green yellow, grown yellow, green yellow." He had made the connection with the tile pattern on the floor to something we had been working on much earlier.

To help children understand concepts, it is necessary to have a variety of experiences in many different settings over a period of time. We can see this in a video clip of a small group activity that helps children develop their conceptual understanding of the quantity five. To understand the quantity five and how many are in a set of five objects, it involves much more than the skill of counting. It is seeing the set of five as the parts of five.

A one and a four, a two and a three, a three and a two, and so on. In this clip, children first select five cubes and they place one on each finger on one hand. These cubes will then be tossed into a plastic hula hoop on the floor. The game requires that they walk five steps away from the hoop, toss the five cubes one at a time, and then identify how many are inside the hoop, and how many are outside the hoop. Then they represent their results by drawing the cubes on a small sheet of circled paper. Let's watch.

Dr. Copley: Ooh, good, one inside, very good. Great. Oh, man, good. Two inside. Oh, well, left one outside. Ooohh. Bounced out. Two outside. Oh, but he... look how good he did. How many did you get inside? Children: Two. Dr. Copley: One, two. How many outside? Children: Three.

Dr. Copley: One, two. How did you know without even counting? Wow. Oooh! How many did you get inside? Children: Three. Dr. Copley: How many outside? Children: Two. Dr. Copley: Two outside. Now, you try again. Who got this one? Did you get this one?

How many do you have inside? Would you count 'em for me? Let's see, how many do we have inside? Count. You have... help me count. One, two, three, four, where's the other one? Where's the other one? And there's one outside. It is your turn now, you go ahead and get them. Okay, keep trying. You've got a few more minutes to try, and then we're going to... You did great, didn't you?

Would you help do the steps for him to try again? Okay. Can you do five steps for him? Okay. She's going to tell you where to stand, see if you can figure out where to stand. Okay. Go ahead, go over there. Oh my goodness, not way over there. That's it. Why don't you stand right there? Now, you watch them, and see how well he does. Go ahead and see, see if you can do it.

Oooh, I want to see this, I want to see this. Keep going. Mrs. Copley wants to remember how good you did. So here's what I'm going to do -- I'm going to give you a piece of paper like this, this is like the hula hoop, right? Children: Yes. Dr. Copley: And, I think when I was trying to remember what I did, I think I got, I think -- how many did I get in the circle? Do you remember? I got zero, didn't I?

And all of mine were outside, weren't they? So I got, one, I'm going to put a little box there, like my little cubes, like a little square, is that okay? I got one, two, three, four, five, I got zero inside, didn't I? And I got five outside. Do you all remember one that that you got?

What I would like you to do is, I'm going to give you a piece of paper like this and I'm going to give you a board, and what I want you to do is go get a crayon from your... from the box. Not, just wait a minute, just wait a minute, in just a minute. You get a crayon from the box and you'll make yours look like... like you threw, like this is what I got, I got zero inside, and five outside. I think I saw some of you get one inside, and four outside. Some of you got two inside, and...

Child: I got five inside. Dr. Copley: ...some of you maybe got five inside. I got five. I have, you got three inside. Does somebody get one inside? Child: I got, I got two. Dr. Copley: You got two inside?

Child: I got it a lot. Dr. Copley: Some of you got a lot. And some of you probably got like Mrs. Copley did with zero inside and five outside. Child: One that just came out. Dr. Copley: If one came out, how many would be inside? Four! That's so good.

Did you hear children begin to talk about the quantity five, as well as the spatial concept of inside and outside? Knowing that five can mean four inside and one outside, or that it can be two inside and three outside, is just the beginning of conceptual understanding of number quantity, an important concept. Let's look at the children's work.

This is a picture of the -- of the sets of five. But this is Amanda's representation. She has two inside and three outside. This picture shows Jeffrey's representation, one inside and four outside. Please note that Jeffrey's objects are not easily definable and they may in fact contain an extra counter.

Conceptual understanding and the representation of the concept takes time and is the result of many experiences encountered in many different ways. Well, let's return to the National Research Council's definition of mathematics learning and take a look at the third strand: strategic competence, or problem solving.

Young children can solve problems, and they use a variety of strategies to do so. Let's observe Angela as she plays the hiding game with me. Watch the strategies she uses as she solves this problem.

[Video begins] Dr. Copley: Now watch, because I'm going to do something special. You got this one in your head? Now watch. I'm going to put this one like this, and I'm going to put... Okay. Try it. Amanda: Watch this! Dr. Copley: Are you ready? Oh, look at that! We both have... let's count them together. Let's use your fingers. One, two, three. You did it again! Are you ready for one more hard one? You just, you're giving me, my goodness, we have so many ones here, you're just trying so hard! Okay.

Now this is the ultimate -- this is the big one. This is one that, oh, I'm going to really... Look at you, you think you can get this one. Now, watch. Got that? Watch what I'm doing now. Okay. Try it. Look at you smiling, do you think you've got the same number as I have? Oh boy. Pull it off and let's see. I have one, two. How many do you have?

Amanda: One, two. Dr. Copley: Let's see. How many do you have? Count again. Amanda: One, two. Dr. Copley: Fantastic. Wow, what a good number person you are! [Video ends]

An excellent four year-old problem solver. Please note that first she had to visualize the number of disks, then watch as I either added or subtracted a specific number. She remembered the sequence, and was able to duplicate what I did. She solved the problem by acting it out.

During our next webcast in November, you will see many other methods that children use to solve problems. Their strategies are wonderfully unique and exciting to watch. The fourth strand in mathematical learning -- reasoning, adaptions -- is one that is in the typically considered part of young children's learning. In fact, some have suggested that young children cannot reason. I disagree.

Although young children can often not express their reasoning verbally, the perceptive teacher can observe their actions and make assessments about their reasoning adaptions. Let me illustrate this with an 18 month-old named Wyatt who was playing with blocks. I observed him over a period of 45 minutes as he selected specific blocks from a

basket of blocks. As he began exploring the blocks, he picked out a small blue cube and held it for a long time. "I like this one."

When asked why he had that one, his verbal response was simply, "I like it." Wyatt then went through the large basket looking at other cubes. He did not verbally say what he was doing. Instead, as I watched, he picked out the blocks that were small cubes and discarded the others. As you can see from this one, Wyatt continued to find more and more small blue cubes from the basket. He then began to put the small cubes that he found in a line in front of him.

He was able to classify the small cubes in a group and color did not seem to matter. Notice the large red cube that he placed by the small cubes. He left it with the group, and only at the end of the time separated it from his special blocks. Finally, at the end of the time, he tossed all of the other cubes that were not like his favorite blocks over his shoulder. In fact, it became his game, and those blocks were quite vigorously discarded over his shoulder.

He then picked up his favorites and took them to another room to clean up. Although this child cannot verbally describe his reasoning or classification scheme, his actions described his thinking, and an important strand of mathematical learning. Now, let's look at the fifth and last strand of mathematical learning: productive disposition.

Productive dispositions are those characteristics that indicate children can do mathematics, such as: flexibility, effort, persistence, desire to learn, and risk-taking. One of my favorite compliments from a child in a classroom where I worked is, quote, "You always have lots of problems, teacher. Come by any time, and we will help."

Why do I like that quote? Simply because = this illustrates that this child has the power to learn mathematics: he is an independent thinker and has the disposition to learn. Let me further illustrate this with a story that occurred in the classroom of a preschooler. I often take puppets in to classrooms.

And in fact they always seem to have a problem, and one day I went into a prekindergarten classroom and I took one of my new puppets -- please note that it is a fly -- that happens to have six legs. I simply talked to the children and said, "I have a problem. This puppet only has -- I only have five fingers, this puppet has six. I don't know what to do with this extra leg," if you will. When I asked them, they were very, very helpful, as children would be.

And they simply just started talking and talking and finally I said, "Tell me what you think!" One of them just simply said, "Miss Copley, just shove it in." And of course when I did, I had a big lump there and we didn't like that. Somebody else said, "Well, take your hand out and try it again." I did, and amazingly, there was an extra fill in -- extra leg. Someone else said, "Just cut it off." Well, that ended up not being a good idea either.

Some of the other suggestions which they were willing to give: one little boy said, "Miss Copley, maybe the people who made the puppets had six fingers." Well, that was something I certainly had never thought of. But we, we all checked our fingers -- and in fact, everybody simply counted their fingers, and you can imagine what that sounded like -- one, two, three, four five -- something that children do when they count. I was very interested in, in another child's comments.

She said, "Maybe it is because flies have six legs." I was very fortunate and very glad that I did not jump in and say, "You're right." Instead, I was quiet and another child next to her said, "Well, you know, I have lots of flies at home and they all have five legs." It was something I wanted to us investigate that day and I had centers set up for insects and -- with insects and spiders, puppets and, et cetera, they were going to investigate.

And while I sent children to different centers and they started. A little girl sat at the front of the room and used her hand, and I could see that she was counting something and she was counting, very, very -- over and over again, very, very rapidly. And finally she raised her hand and said, "Miss Copley, if you count your fingers real fast, you get six." What I love about that story, is it certainly tells me a lot about their understanding of numbers.

But most of all, I love the disposition that she exhibited because what they were saying to me is they could solve problems, and they were interested in helping me, and that was giving them power in mathematics. Research indicates that teachers' words and modeling often facilitate children's productive dispositions.

Phrases like "good work," "you were really trying," or "you're really thinking about your answer," or even modeling an attitude of, "Oh, well, I will try again" when you have a particular problem, can facilitate productive dispositions.

Conversely, phrases like, "you have such a good math brain", or, "You are so smart with numbers" do not facilitate productive dispositions. Children know they can't go get a new math brain, and as a result, may give up. Well, let's review. We have just discussed the first part of our presentation, the "what" question. What is mathematics learning? Or, What is proficiency in mathematics?

Remember that according to the National Research Council, it means that the learner has procedural fluency, conceptual understanding, strategic competence, reasoning adaption, productive dispositions. These will be especially important as we look at part two, the "how" question. How do we facilitate mathematic learning? As we take the short break, please consider submitting your questions or comments using the field on your viewing screen. We'll be back in a few minutes.

Welcome back to part two of our webcast, the "how". How do you facilitate mathematics learning? In your own words, how do you teach it to young children? In this part, we'll cover three important topics. Number one, what we want children to learn -- the outcomes. Number two, where do we find mathematics learning? And number three, how does the teacher intentionally plan for learning? To facilitate learning effectively, we look at what we want children to learn.

Let's look at the Head Start Outcomes -- the Child Outcomes that specifically relate to mathematics learning. In the mathematics domain, there are three elements listed: number and operations, geometry and spatial sense, patterns and measurement. Next, in the approaches to learning domain, reasoning and problem solving relate to math learning. Then, in the language development domain, both listening and understanding and speaking and communicating relate to mathematics learning.

Finally, in literacy, early writing, and in science, scientific skills and methods can both relate to math learning as well. I am sure you noticed that not all of these listed outcomes are specifically mathematics, and you are correct. However, all of them can be connected to math learning in some way. We will be listening to children talk about math.

We will be using scientific methods and collecting and organizing data and graphs, and we will be asking children to represent their mathematics ideas using early writing skills. It is important that we recognize these outcomes are connected to mathematics learning. So what do other organizations think about what mathematics young children should know?

In 2000, the National Council of Teachers of Mathematics, or NCTM, wrote and distributed the Principles and standards for School Mathematics. They include standards applicable for all mathematics, from prekindergarten to twelfth grade, a step that emphasized the importance of early math development and its connection to learning mathematics throughout the school years.

In addition, NCTM listed five content areas that are important to children's mathematical learning. They are: number and operations, geometry, measurement, algebra -- and, for early childhood teachers, that might be patterns. And the fifth one, data analysis. These sound familiar, don't they? Indeed, NCTM Standards relate directly to the Head Start science and domain elements.

In addition, NCTM made a suggestion about the emphasis that these content levels are given in each area as illustrated in this graph. Notice the importance of number and geometry and measurement at the prekindergarten level, as indicated by the size of the colored areas. In fact, these three areas are to be the focal points of instruction at the pre-k level. Again, this content is familiar to you, because they're each classified and listed in the Head Start math outcomes.

I like to provide an illustration of these content areas as recommended by NCTM and the connection between these content areas and the Head Start Outcomes. First, NCTM's number and operation clearly connects to the Head Start mathematics domain element of number and operations. Second, geometry connects the geometry and spatial sense.

Next, measurement and algebra are both connected to the Head Start domain elements of patterns and measurement.

And finally, data analysis is connected to both the Head Start domain elements of number and operations, and scientific skills and methods. Mathematics involves more than content -- it involves specific processes, and as you might expect, these processes connect directly with the Head Start Outcomes. The processes listed by NCTM are communicating, connecting, reasoning, problem-solving and representing.

As you can see, communicating fits the language domain and connecting is emphasized in the science domain. Then, both reasoning and problem-solving relate directly to Head Start's approaches to learning, and representing is connected to science, as well as early writing and literacy. Please note that these are all outcomes you have been addressing already. There are no new ones to add. The process skills are to be taught in all of the content areas.

Here's the visual of how the process skills intertwine with the content areas, connecting and -- in a weave pattern. The connections might seem obvious. Problem-solving, reasoning, representing, and communicating are critical processes when children learn number and operations.

And in geometry, and in measurement and in patterns, and in data analysis, if you think of the Content Standards as the vertical part of the weave and the Process Standards as the horizontal, you'll see an illustration of how mathematics content and processes weave together. This shows that mathematic processes should each be involved in every one of the content areas. Hopefully, you have also seen how the Head Start Child Outcomes are directly related to the NCTM Focal Points.

In addition, the position statement issued jointly by NAEYC and NCTM entitled "Promoting Good Beginnings," illustrates the importance of these connections and mathematical learning at an early age. They all express the same ideas in different ways, so there is agreement: early mathematics is more than just counting, and it involves lots more: communicating, problem-solving, reasoning, representing ideas, and especially important, enjoyable mathematics.

It is important for us to know both the Content and Process Outcomes to facilitate learning math effectively. Now, the second part to answering the question, "How do you facilitate learning mathematics?" is to know where you can see children's learning take place. Some of these are: during play, inside and outside, during center activities, in their work products, in their conversations, during class experiences, at home, during routines and circle time.

We have seen children learning math in a variety of places. Let's look at some of their work. This is Danielle's journal response showing her favorite game. It is her illustration of the counting circle game, a game that will be introduced in the later webcast. The person with the blue eyes at the bottom of the circle is Danielle. As you can see, she's demonstrating her enjoyment or productive disposition of mathematics from this journal response.

In this next picture, the young child is playing outside and seeing how far she can go and how quickly she can travel. This slide shows a picture four-year-old Angie drew in the art center. When asked to describe it, she said it is a pattern: frowning, smiling, frowning, smiling. In this picture, children playing at the sand center are using their measurement skills as they fill a variety of containers. And here's yet another wonderful example of children learning mathematics.

At the beginning of each day, I give a note to children that emphasizes the time words: today, yesterday, and tomorrow. Well, children cannot read the note -- they always notice their names -- and they begin to learn and use time words in their conversation. This note states, "Dear class, today we will learn a new game. Yesterday we classified some new fish. Kim, Kay, John and Theresa classified farm animalsas well. We have lots of animals with four legs. And tomorrow, we will go on our counting walk outside."

Note that these terms are connected to class activity, and not to specific calendar numbers. Children remember what they did, and not the specific date of the month. Answering the rest of the question, "How do we facilitate mathematical learning?" involves looking at how the teacher intentionally plans. Two basic principles need to be practiced. The first one, the teacher needs to intentionally plan math experiences in a variety of settings.

The second, each of these experiences needs "mathmatizing" or specific mathematical language that is added to a child's natural vocabulary. I'll illustrate these ideas with an activity that began in the block center. Children were experimenting with new colored foam blocks of different geometric shapes for about a week. One afternoon, I joined the group in the center and intentionally taught a small group activity.

Specifically, I wanted children to investigate the attributes of three-dimensional shapes -- that's a mathematical outcome -- and I wanted them to use language to express their ideas. I told children that I was very interested in building the tallest possible tower with these blocks, and I needed their advice. Then I gave each child a colored square and asked them to build the tallest tower they could on their paper. Let's listen in to what happened.

[Video begins] Dr. Copley: Wow. How really good. How tall are they? Wow. See how... see how tall you can go. See how high you can go. My goodness, look how tall. Be careful. Oh, yes. Yes. Good. Child 1: Look what I did! Miss Copley? Dr. Copley: See how tall you can get it to go. Can you get it to go real high? That's neat. But, oh, well, try it again. See how tall you can get it.

Child 1: Mine is not... mine keeps falling. Dr. Copley: Can you keep going up high? Can you build up maybe? That's good to do the side. Great going. We'll put more blocks out. How high can you go? Wow, yours is tall too. Yours is just a little taller than hers is. Just a little taller. Oh, my, you're doing good. Look how tall that one is, oh, my, wow go, yes, that's great, yes. Wow, yes. Oh, well, try it again...

Are you going to use that one on your blocks? You going to use this one on your blocks? Is this -- is this a good block to use? Girl: No. Dr. Copley: Why not? Children: Because it is -- because -- It would knock out, it would knock out. Dr. Copley: It would knock out? Yeah, it would knock out. Well, keep going. Do you need more blocks?

What would I start with? A rectangle, one that has a rectangle on the side? And you guys said I should use a red one? Child 2: No, a square. Dr. Copley: A square? Well, let's see if I can find one with a square on it and rectangle. Child 2: I can see a square!

Dr. Copley: Look, this one, this one has a square, on this side, and this has a rectangle here, that would work. Now, how should I put it, should I put it like there or that. You can only use your words, and Miss Copley has to see if she can do it. This way or this way? Help me.

Child 3: This way! Child 4: No, not standing up -- upside down. Dr. Copley: Upside down? Like this? Like this? Child 5: Not standing up! Child 4: Squares like Spongebob!

Dr. Copley: Like Spongebob? Like this? Child 1: Yeah, yeah, yeah! Child 3: I just watched him on TV. Dr. Copley: Okay, I want to hear his words, I want to hear, you said "like Spongebob, make it like that." Does this work like this?

Child 4: Yes! Dr. Copley: All right. Child 4: That's like Spongebob, and he has feet. Dr. Copley: And he has feet. This guy doesn't have feet, does he? Yes, sir. All right, what would you like me to go to next. Tell me what's the block I should use next.

What would you think? Because you guys made tall towers. Could you describe the ones. Could you tell me? Child 2: This one right here. Dr. Copley: This big one here? Okay, what would you, where would you like me to put it? Raise your hand if you... Do you want me like this? Child: Yes. Dr. Copley: Or like this?

Child 4:Yes, like that. Dr. Copley: Like this? Child 5: [inaudible] Dr. Copley: Okay, so if do I it like this, okay, everybody go "yes" with me. Yes. Okay. All right. Now, to help me out, give me what blocks should I use next? Let's listen to Andrea tell us. Which blocks should I use next?

Child4: His name is Andrea. Dr. Copley: Andrea. I'm sorry. Andrea. Andrea: Blue. Dr. Copley: Blue, you want me to use a blue one. Should it be this shape like this?

Child 4: No, that's baby blue or something. Dr. Copley: Oh. Child 4: Light blue. Dr. Copley: Is it okay, is light blue

what you want me to use? Is this the block I should use? How should I put it?

Child 1:Like this. Dr. Copley: Like how? Like how? Child 1: Like this. Dr. Copley: Like this? Child: No.

Dr. Copley: Use your words, remember, use your words, what would I do? Child 1: Like this. Child 4: Lay it pside down. Child 2: Yes. Lay down. Dr. Copley: Lay it down. Oh, like this?

Child 4: Yes. Dr. Copley: Oh because somebody made one with them like this. Were you the one that made them like this? Child 4: I made it. Dr. Copley: Oh, you guys did. Because if I did it this way...

Children: It would fall off! Dr. Copley: It'll fall off, so I should do it like this. [Video ends]

The video clip we just viewed was the beginning of a game called block stacking. Later children are introduced to large dice, and it is expanded to number outcomes as well as geometry. Children added a particular number of blocks to one of two towers in a game-like setting. For example if they throw the die and a two is shown, they place two blocks on the tower during their turn.

Notice that with this activity, the teacher intentionally planned the experiences based on what children were already experiencing in the center, and that the activity was directly related to mathematics and approaches to learning outcomes. Did you hear me "mathematize" the children's language during the activity? Language is very important in mathematics learning.

It is important to know what children mean when they use a word, and it is equally important to use specific vocabulary that has been mathematized. Let me give a couple of stories that illustrate that fact.

The word "big" is a word often used by children. When we talk to them, we need to talk and use that word and really expand on it or "mathematize" it. In this particular picture that you see, a little baby was being viewed by a little girl. And the little girl, when she looked at the little baby, simply said, "I'm so big." Well, from my viewpoint, that little girl wasn't very big but she was defining that word based on her prior experience, and she looked at that child and she was certainly bigger than that child.

Another example was one that happened to me when I was walking a group of children out to a bus line one day, and a little boy was holding onto my hand, and he looked at me and he said, "Are you bigger than my teacher, Mrs. Copley?" I'm always worried about my size, so I simply said, "Um, do you mean taller?" As you can see, I was mathematizing that language for him. And he looked at me and he said, "No, no, no, no, not taller, more numbers." Now, his view or his understanding of "big" was age. I was also older, but that was okay.

What I was trying to show you here is that the word "big" means a lot of different things, and as you talk to children, using those words that mathematize it, like "taller", "longer", "weighs more", "holds more", whatever, would be important as you talk to them. Well, now let's review what we have learned in part two of this presentation. We have just discussed the "how" question -- how do we facilitate a child's mathematic learning?

Remember, we discussed three ideas. Know what you will be teaching, or know the outcomes. Number two, know where you may see mathematical learning, and number three, know that you should intentionally teach mathematics by planning and mathematizing language. What else? Now we're ready for the third part of the presentation, "What else?" Remember this is your opportunity to respond to my questions, or to ask your own. But first, remember the "Where is the math?" pictures we saw at the beginning of today's webcast?

Before we get to your questions, let's look at some of the potential math experiences the teachers saw in those pictures, and the questions they came up with. In our first picture, one question could be, "How does this ball move?" Or simply, "Roll the ball. See what happens." Note that investigating the ball's movement or attributes is a geometry outcome. In this picture, "How tall is your building?" Or, "What would happen if you used one of the triangular prisms on the floor in your tower?"

Those are just two questions that could be asked of this child. Both would involve measurement and geometry outcomes. This picture illustrates so many possibilities: "How long is the shadow? Can you measure it? Can you make it longer or shorter?" In this next picture, we could ask, "How many pumpkins are there?" That would get some interesting answers. And, "Which one is the biggest? Which one weighs the most? Which one is the smallest?" And, "Which one would be the easiest to pick up?"

These are just a few of the possibilities in this fall experience. And in this final picture, is there any question about this child's delightful disposition when he can walk in Daddy's shoes? The measurement questions and words are many. "How far can you walk in Daddy's shoes?" Or simply, "Your shoes are too big or too long" are just a few comments that you could make. Well, now it is your turn. What questions do you have for me? Also joining us for today's Q and A session is Amanda Bryans. Amanda?

Amanda Bryans: Thank you Juanita, we're going to go right to an email question. I have a question from Jean in New Hampshire, and her question pertains to home-based, and I'm particularly glad this question came in, because as you know, in home-based, Head Start home visitors working with the parents to support the children's learning and the question that Gina has provided is, "Could you give a few ideas of the things that home visitors can do during a home visit to support math learning?"

Dr. Copley: A very good question. Home learning is critical, as you know, to all children, young children. And one of the things that is so interesting to me is that math learning begins very, very early. I hope you could see that, even in the illustrations I gave today, those were based on children's experiences, you -- everything you do at home could be based on those experiences they have at home -- setting the table, making sure they have one-to-one correspondence between silver and glasses and those kinds of things.

But even just counting -- children love to count, and even building with shapes and so many outcomes are things that can be naturally done at home. We're going to be talking a lot more about that in some other of the webcasts that we do.

Amanda: Thank you Juanita. We want to remind our viewers that our phone lines are open. Please remember to tell our operators your first name and where you're calling from. If you experience a long wait time, you may prefer to submit your question online or by fax.

Please also do not use your speakerphone, and once you ask your question on the air, hang up. Remember, if you don't get to ask your question in this segment, we'll be posting today's questions and answers on the ECLKC along with an archive of the webcast. Let's take another email question now. This question is from Jacqueline, and Jacqueline is in Michigan, and she wonders, "At what age do children begin exploring math concepts?"

Dr. Copley: That's almost like a question that would be simply, "At what age do they begin learning?" Young children -- we know from some early research that has been done, that young children can even detect when a quantity of objects has been changed. For instance, if they're looking at three objects at a very young age and it changes suddenly to two objects, they act more interested. It is something they seem to note or be able to tell.

Young children learn very, very early and just based on some of those experiences, if you can use words that mathematize what they've seen or used, words that they love to describe, or even if you can just count with them, play with them, talk with them, just all of those wonderful good things, that you automatically do with young kids.

Amanda: Terrific. Thank you, Nita. And we'll be later in the year providing you with more resources around supporting math learning and Early Head Start programs, with our infants and toddlers and their families as well. We're going to go to another email question now. This one comes from Jackie in New Hampshire. Jackie is a lead teacher at one classroom Head Start site, she wonders about ideas for getting started with doing more related patterns.

This is a question that we have heard frequently from Head Start education staff, that the patterns seems to be one of the areas that we have the least familiarity with -- the fewest ideas about how to get something started it in the classroom.

Dr. Copley: I'm glad the question is asked, because patterns -- really, mathematics is patterns, and it is such an important part. I also would say, that even if you're asking the question, it doesn't mean that you've never done patterns in classrooms.

Just the songs that you do with children are often by a particular pattern. Many of the books you read to students are done with patterns. The clothing, so many things in your room are automatically patterned. And so, even the patterns outside on a nature walk -- what is important is that you learn to identify those patterns and talk about patterns and have children create and extend those.

One of the interesting things that you're going to find out is that we're doing a webcast entitled just "Patterns", and it will be I believe our fifth webcast, one of the ones you might really want to notice, because we'll talk a lot about how you can facilitate mathematical learning with patterns.

Amanda: Great thank you, Nita. We're going to go to another email now, this is from Susan in Oklahoma. Susan is a mentor coach and her question is, "Should we use big math words with children?"

Dr. Copley: I've -- I'm always amazed at children's use of vocabulary, they love big words, and they really it is something they enjoy doing. Tyrannosaurus Rex is a word most young children know. I think it provides a perfect opportunity for us to teach big words with kids. It makes sense. They love to use them and use them correctly. One of my favorite words to teach young children is the word "quadrilateral".

Now, we'll talk about that in geometry, but why I like to use it is that children love the word and it's really a wonderful word that talks about any four-sided shape. You just haven't lived until you heard a kid say "quadrilateral" with or without teeth.

Amanda: I think that speaks to making sure you're keeping parents involved, they need to know not being be totally surprised when they hear their children pronouncing something like "quadrilateral". They may need a little reviewing themselves to recognize that, that shape.

This is another email question now, we've got Paula from New Jersey. Paula is an education supervisor -- we hope we have many of those on viewing today -- and the question is, "What kind of professional development experiences are necessary for, for teachers to be become better at engaging children in math?", and I really like the way she phrased that question.

Dr. Copley: I think the role of anybody who does professional development with teachers of young children want to be able to engage them in mathematics. I've done a lot of experiences in professional development with teachers, and what I find is that they want to do really good things with mathematics with kids. But often, there are some road blocks to that development.

As you heard from the very beginning, the teachers on the very beginning of the film, they talked about their poor experiences in mathematics, and their lack really of professional development. I think that's one of the first road blocks to this type of learning. I find that I always want to teach teachers some math, because it is important for them to know some mathematics and feel confident in the mathematics they know.

We will be working -- each of the subsequent webcasts, we'll be learning some math, and students and people who watch it will be learning having opportunities to do that. But it is also important to have mentoring and coaching, and in the video clips that you saw here, there were examples of me teaching in the classroom. But these are classrooms that I coach in, and that I work with the teachers. I've learned so many things from watching them teach, and they've learned from me.

And it becomes a wonderful relationship and in which you really can professionally develop teachers in mathematics. I hope to be able to share with you many examples of teachers who have enjoyed strong professional development in mathematics for young children, and who thus have really made a difference in kids' lives in mathematics.

Amanda: Great. I was thinking as you were speaking, a great starting place for a program that wanted to initiate some new professional development opportunities around mathematics would be to talk to the education staff just in the way you did about their own early memories of learning math, and success at math -- it is, just get some of that out on the table, and start to see where everybody is, and what they may be thinking about teaching math. Terrific.

We have an email from Deonne from North Dakota, and I'm really glad she wrote in because she's a -- works with Head Start family child care, which is another option in Head Start. She also asked a question, It doesn't, it doesn't matter what option you're in, the question comes in, it doesn't matter either what subject we're talking about -- "How can we help parents understand that children's math learning with manipulatives and other real objects should precede pencil and paper-type math learning and expression of math knowledge?"

Dr. Copley: I think that's a wonderful question. Again, if you think back to one of the statements I made earlier in the webcast, I talked about the fact that we often heard when we were learning mathematics, just simply, for instance "Invert, multiply, and don't ask the reason why." I think if you think back to your prior experiences, you think of how many times, you just, learned the procedure and didn't have the stuff, you didn't understand it, because you didn't see the numbers or didn't understand how you formed those opinions.

It is critical for young children to have materials to play with, and to connect to mathematics learning -- not just blocks, but counters of all kinds, objects that have patterns, things they can take apart and put back together again, even the cubes that we were just, that I used earlier, where I took the five and put them together, these five cubes, when they're put together, give them another illustration of what five is -- the height of five versus the individual cubes.

This is a very important -- manipulatives are important. It helps children understand, it is also something they can do over and over and over again. I don't know if you've ever seen children do use manipulatives, many, many, many times -- whereas paper and pencil, they're often working with other skills, such as writing and drawing, and that's something that is very difficult for them.

Amanda: Great. Thank you Nita, we're very delighted now to be able to welcome Patricia from Tennessee. She's on the line and we love to hear your question. Patricia from Tennessee. Okay. We'll go to an email, there was a little technical glitch, this is a great question that I think is a little bit related to the one you just were talking about, to expand that a little bit further. "How do you know if children really understand math, versus just saying the words -- the vocabulary of math versus the actual conceptual knowledge?"

Dr. Copley: I think that comes from many different opportunities. You heard me say several times in the webcast, you heard me say things like, "They need a variety of experiences in a variety of places." And just asking children more questions, seeing if they can apply the information from one situation to another, is really critical.

The assessment you do with young children in math is so important, and the questions you ask will really make a difference. In the next webcast on number and operations, you're going to see me do quite a few number assessments with children. I think you'll see that will be very important.

Amanda: Terrific. Now I have another email question, this is from Diane and the question is -- she didn't list the state -- "Was there a reason that you seemed to prefer soft blocks to the heavier wooden unit blocks?"

Dr. Copley: We used the wooden blocks a lot in classrooms. I think they're very, very important. I was using the soft blocks there, because the object was to build as high as you could and I was really wanting them to be able to build very high without anything falling down and hitting the next -- person next to them in many ways. But also, I wanted you to notice the difference in some of the blocks.

There was a variety, the triangular prism of course is one that sometimes is in the brown blocks, but it had a big variety. It also, I don't know if you saw, there was a sphere, that was very important. I wanted them to try that one. Again, just lots and lots of blocks, a variety of shapes and kinds. The soft ones I was using there simply because it

was, it was easier if they fell over.

Amanda: Great. So using both at different times. Dr. Copley: Yes. Amanda: Appropriate. Dr. Copley: I use all of them.

Amanda: We think we've got Patricia from Tennessee on the phone, we're trying again. Hi, Patricia. I'm not sure we do have Patricia. Dr. Copley: We'll get to you sometime. Amanda: Yeah, we're working on it, and we apologize for that. This is from Amy in Vermont and her question is, "Can you review strategic competence?"

Dr. Copley: Strategic competence was just really a short version and you're going to be hearing a lot more about it. It is, "What strategies do children use to solve problems and how do they -- how do they think through?" And the little girl in the story was, or in the picture, in the video, was doing a, a, a hiding game with trying to figure out what was underneath that cardboard and be able to do it -- she solved it by simply acting it out.

And then she was copying -- what you don't know about that little girl was that she was not able to count from one to ten successfully, but she could see the picture and so she was able to visualize and draw and act out that story. Strategic competence involves a lot of things. It involves being able to figure out how to balance blocks if I'm putting them together in a tower. It involves being able to decide what comes next in a pattern. It involves a variety of things.

Amanda: Great, thank you. Now we've got another caller. We have a Tonesha from Virginia on the phone. Dr. Copley: Hi, Tonesha. Amanda: Okay, it seems like we don't have Tonesha from Virginia on the phone. Again we really apologize for that. I have an email question here, this came from Nicole in Michigan, I'm going to rephrase your question a little bit, Nicole, I hope that's okay.

"How do you manage, this is typical in a Head Start classroom, there's a great diversity in kind of, stages and rates of learning. We have many children, enrolled in Head Start who, who have IEPs and diagnosed disabilities and children with great range of experience as far as early math. How do you plan for that and there's a tremendous variety of interest at different times, that children express."

Dr. Copley: I think you saw a few times when I worked with the whole class -- in fact, the only time in any of the video clips you're going to see, or in the classrooms where I'm working with the whole class, is in the circle activity where I may be doing a five-minute counting activity as you saw. And so, the -- those kinds of things, I teach the whole class very seldomly. I teach them in small groups -- you saw most of that going on. Teach individual children.

What I love about teaching mathematics is that, if you go with children's interests and really intentionally teach to their interests and their experiences, you're able to really meet the needs of individual children. It is not easy, and I'm not telling you anything new, but there are some different management strategies that I'll try to, to illustrate, in some of the subsequent webcasts.

The big issue: observing individual children and knowing something about, about what they're good in and what they're doing, and building on that, and mathematizing for them wherever they are is key to that. Dr. Copley: And sometimes giving them a word to describe what they're doing is helpful.

Amanda: Great. Okay, we're going to try to the phone again. This is Jennifer from Colorado. Jennifer, are you there? We're not getting any sound here at all. We don't. Dr. Copley: We're trying but we're not doing well from that part. Amanda: So this is a question that I think many Head Start folks probably have on their mind. "Are there math facts that we have to make sure all kids kind of memorize before they leave Head Start?"

Dr. Copley: The answer the short answer to that is "no". The long answer, though, is one that I think you saw -- began to see illustrated when we were talking about the hoop game that they played, to look at the number five. You remember them throwing the little cubes inside and saying, "I have two inside and three outside", "I have one inside and four outside." We do these kind of number activities all of the time.

And when we do that, very likely by the end of Head Start or by the end before they enter school, they will automatically know what the parts of five are. Now, that in reality is learning the, the basic facts, as we sometimes call

it, for five, so that five can be thought of as a one and four, or two and three, or a four and a one. So you can see, that, that, they -- I really believe they've -- they will learn those if you talk about it from a number quantity aspect -- the part-part-whole activity.

Here's what we will do. I'll tell you when we talk about that number and operations next time, you're going to see lots and lots of possibilities for learning facts but not learning them from a memorization standpoint, but learning them from a conceptual understanding.

Amanda: Terrific. We're doing a live demonstration here of the importance of persistence and making something here. So we're we've got Tonesha from Virginia. Tonesha, are you there now? Tonesha: Yes, can you hear me? Dr. Copley: Wonderful.

Tonesha: Excellent, I have a question about working with parents. What are some of the things that parents should be involved in doing with their children, and I guess, an even bigger question, is how do they get this information, how do parents know what kinds of things they need to be doing with their kids?

Dr. Copley: It is a good question. I think that for instance, let me just give a little advertisement. Sonoma is working with Head Start this, on this particular project, university, and they will be putting out some information about what families should be doing and what parents should be doing. But I also need you to know that on our website, we'll be putting some information for families and parents, for them to look at these areas of number and operations, geometry, and these particular content areas.

More importantly, what I really think will be the most helpful for families is for them to really observe and experience with their children and talk about counting things, looking at things from the perspective of "Where is the pattern?", "Where is the math?", talking about words that describe measurement to kids, using stories, and we're going to be doing a lot of those, to really get at, mathematics concepts just as the Head Start Outcomes are listed.

There's so many things to do. But I think the number one thing to do first of all is just watch your children. Do you remember -- do you remember the little boy Wyatt, 18 month old -- in the pictures. I was just sitting watching him with the blocks. And I watched him just pull out certain blocks. Watched them and talked to them about what they're doing.

And it is, it is really kind of exciting to see what you're going to be able to do with math. Please watch the website, there really are going to be some really important information for you. Amanda: And some of that will include, some resources that grantees can -- programs can use, to share directly, with parents.

And Sonoma is charged with the developing of those resources and we know in Head Start, that the parents are the most important teachers of children. We want to have really big effects, we always want to make sure that the information is conveyed effectively to parents. We're excited about that element and as Nita suggests, keep an eye on our website.

And really the most important part, is, is just to know that this is the beginning of what we're starting, and you're going to be seeing a lot more. Amanda: Great, I have an email here from Theresa in Texas. She's asked quite a specific question, "What is the best way to teach a child to continue to count past the point of 15 or so?"

Dr. Copley: Well, what is so nice about our number system -- you'll see this a lot next time -- is that it repeats in a pattern, after it gets past 13. And so, while the first ten numbers and actually the first 13 numbers are really different and unique, what happens after they get past 20 is of course, a pattern. So, 21, 22, 23, 24, so on is easy to count and then once they get past the decade numbers, 20, 30, 40, and so on, it is a pattern.

One offer my favorite questions to ask young children, especially those who say they could count to 100, when they stop at 100, I say, "Well, what would come after 100?" It is amazing once they know that one comes after -- it's 101, then they start seeing that -- the continuity and the continuing of the number system. It is really exciting to see what they can do. We'll talk a lot more about that in number and operations, 'cause one of our big topics is counting.

Amanda: Great question, thanks, we have a question from Zuhale in San Juan, Puerto Rico. This question came in Spanish. Her question is, "When should we expose children to written numbers?"

Dr. Copley: Good question. I happen to think letters and numbers should be all over the place, and they should see those numbers and see those letters early on. Now, the important thing for you to realize is that just because a child can identify the symbol "three", it does not mean that they know what the quantity "three" is.

But again, those numbers should be around, you should label them, you should use those numbers as labels. But again, those are numbers that are simply labels for the quantity. The important thing is the quantity and then also the counting.

Amanda: Terrific, we already arrived at our last question, I want to say we have a number of other questions that we didn't get to and we will be posting those, but this is one that we absolutely had to include from Diane in Pennsylvania. "What do you have to say to teachers who are slaves to the daily calendar ritual?"

We have all seen it, the whole, most of the circle time is occupied with having a child come up and do the date and count the numbers for the current day and talk about the month and year. Dr. Copley: I hope you heard a few things that would give you maybe hints about my belief about the daily calendar. I'm not against routines and doing things on a daily basis.

What I wanted you to see with that letter that I wrote was, rather than talk about "Today we did this and tomorrow we're going to do this, and yesterday we did this," we should talk about what we did, the events, not the calendar date. Young children who are just learning numbers do not need to know that today, for instance, might be the 25th and the day before was the 24th.

There are so many patterns and so many routines, and so many events that are important to do, that if you spend your time doing things that are not experiences that children relate to, you're wasting -- I believe, wasting time.

Now that doesn't mean I don't believe that you should do some routines and you certainly can talk about today and many other things. But please know that I think there's so many patterns and so many valuable things and experiences that kids have, that being a slave to the calendar is not helpful to children. Well, I think you said that was the last one, so...

Amanda: I'm afraid so. Dr. Copley: Those are all the questions we have time for today. We want to thank you for everyone who phoned, even though we didn't always get to hear them, we want to thank you for that. We want to thank you for those that faxed or emailed your questions or comments to Amanda and me. They were excellent. We appreciate it.

Let's take this opportunity to reflect on what we have discussed in this first math webcast. In part one, we defined mathematics learning as five different strands: procedural fluency, conceptual understanding, strategic competence, reasoning adaptions, and productive dispositions. In part two, we discussed how we can best facilitate mathematics learning by talking about the Child Outcomes, where we can see mathematics, and how we can intentionally teach mathematics.

Then, in part three, your questions and responses helped us see what else we can learn about mathematics. Today's presentation was just the first in a series of six webcasts emphasizing mathematics in an early childhood settings. Before the next webcast session, we would like you to think about the following questions. What materials did you see used during this session and what materials would facilitate mathematical learning?

Number two, how intentional are your teachers about teaching mathematics? And number three, what one thing could you do tomorrow to help teachers see, "Where is the math?" I look forward to talking with you again in November as we address the critical issue of number and operations for young children. And for that, we're going to go back to Amanda. Amanda?

Amanda: Thank you. Thank you for providing us with such an informative and inspiring overview of early childhood mathematics. In our next webcast, we will take a closer look at number and operations. That webcast will take place Thursday, November 8th from 3:00 p.m. Then our series will start again in January when we look at geometry and spatial sense. In February we will focus on measurement, and March will be devoted to patterns. Our final webcast will be in April of 2008 when we will put it all together.

Each upcoming webcast will feature specific content on the topic using the same format Juanita used today. First we will define the content by answering the "what" question and then we will talk about how we facilitate mathematical learning in the content area, and through our question and answer session we'll discuss "what else"?

We encourage you to keep visiting the ECLKC for additional information about math learning as well as supplements in the web series. Also, we welcome you to send additional questions about today's webcast or suggestions you have for future webcasts to the e-mail address you see on your screen now. Remember, today's questions and archive of this webcast will be posted on the ECLKC.

Thank you again for taking the time to be with us today for the first webcast in our six-part series on early childhood math, but most of all, thank you for the time you take every single day to make a difference in the lives of the children and families we serve.

The work you do has such a significant impact on so many people. It is truly incredible, and for that you should be incredibly proud. We look forward to seeing you again soon on November 8th. Until then, enjoy finding and experiencing math. [Music]
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-- Premalink for viewing (requires Flash and javascript)

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