

**The “M” in STEAM:
Research on the Go Podcast**

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Announcer: Welcome to Head Start Talks, where big ideas support your everyday experiences.

Amelia Bachleda: Hello, and welcome to Research on the Go, a podcast where we explore some of the latest research in the field of child development, its implications, and practical applications.

My name is Amelia Bachleda, and today I'm joined by Marley Jarvis.

Welcome, Marley.

Marley Jarvis: Hi! Thanks for having me. Amelia and I are both from the National Center on Early Childhood Development, Teaching and Learning, and we're based at I-LABS – the Institute for Learning and Brain Sciences at the University of Washington in Seattle.

Amelia: In this podcast, we want to not only talk about the research itself, but also to provide a space where we can talk a little more deeply about ways to incorporate it into your work supporting grantees.

Marley: Today we're going to talk about how babies engage with the "M" in STEAM – Math.

Amelia: Math is everywhere, and it's an important part of learning and development, but it can often seem a little scary.

So, Marley, to get us started, do you have any tips for how adults can feel more comfortable with math?

Marley: Yeah, many people seem to have had negative experiences or associations with math. Maybe they feel like math might not be for them or that you need to be a "math person" to really feel comfortable with math, but this really doesn't have to be the case. What's so important to understand is that math is all around us everywhere every day. It's a communication tool that helps us understand the world we live in and is embedded in everything we do.

Amelia: As Early Childhood Specialists, you have an important role to play in helping to shift that narrative by supporting programs and developing what I'd like to call a pro-math culture.

So, let's talk a little bit more about what this is and why it's so important.

Marley: So, unfortunately, there are a lot of messages out there about who can and can't do math and kids pick up on this. So, for example, as early as 7 or 8 years old, girls and boys already think that math is for boys.

Amelia: And I think that is so unfortunate, and it can have real consequences. Thinking that I'm a math person or feeling really good about math actually translates to better math scores. So, we want to

really think about how we can help our youngest learners avoid getting stuck in this trap of thinking that math isn't for me.

So, Marley, how can we work to help all children see themselves as the mathematicians that we know that they are?

Marley: Yeah, there's a couple different things we can think about. Adults, when possible, should try to avoid saying things like, "I'm bad at math."

Amelia: And this is a really common one. People say it all the time. It just slips – It flies out of our mouth – "I'm bad at math."

Marley: Yeah.

[Laughter]

Amelia: Maybe when we're trying to write the tip at a restaurant, and we're feeling stressed about it. It happens so often.

Marley: So, try to catch yourself. Try to avoid saying things like, "I'm bad at math," or generally giving off this vibe or feeling of being uncomfortable when talking about math.

To help support programs, you might think about ways to encourage staff and families who may feel uncomfortable with math to not show that as much when they're talking about math.

Amelia: And one great way for staff and families to do this is to make math just a regular part of every day. Math doesn't have to just be for math time. It can happen as an adult counts the toes of a little infant.

I think we've all done that before while changing their diaper, or talking about the pattern on a toddler's shirt – just thinking about infusing math into our everyday interactions with the world.

Marley: Another great time is while reading books. Integrating math into books can happen even if the book isn't obviously about math. You can use any book to help communicate math concepts.

For example, maybe count how many characters or animals or trees or something you see on a page. "There's one bunny over here, there's three bunnies over here," and point to each bunny as you count them, or you can even talk about how many pages you've already read and how many there are to go. "We are almost done. We just started."

Amelia: Right – this idea of using math as a way to describe our circumstances in the world. "We read one page, and there are a lot of pages to go."

So, counting and patterns, and these are obvious go-to ways to engage with math, but that doesn't mean that they're the only way to use and think about math. Math can be used as a language. So, what are some other ways to think about math in that sort of language context?

Marley: Yeah, I'm so glad you brought that up. Math is a language, and, so, because of that, we can use math to describe so many different things – even something as abstract as feelings, for example.

Amelia: Right.

Marley: So, maybe having an adult use math to help a child think about how happy they are feeling right then. Maybe “1” would be just a little happy or maybe “10” might be a lot happy.

[Laughter]

Or you could even use that to help them wrap their brain around how mad they're feeling or how sad they're feeling.

Amelia: Yeah, or maybe even how wiggly they're feeling. Are they having a little wiggles right now or are they having a lot of wiggles?

Marley: Ten wiggles!

Amelia: So, many wiggles. Adults can also use numbers to think about how loud or quiet an environment is. So, maybe instead of thinking about let's use our quiet indoor voices or our loud outdoor voices, we can think about using our 1 – our 1 quiet voices or our 5 medium voices or our 10 really loud voices!

Marley: And we brought up patterns before, too, but there are many more patterns than just simple color or line patterns that might first come to your head. So, when you're thinking about patterns in your everyday, a predictable routine is also a pattern.

So, for example, maybe reading always happens after lunch and before naptime. That is a pattern.

Amelia: Yeah. That's something that we do every day. It's predictable. One thing happens, then the next thing happens, then the next thing happens, and we know based on where we are in the day what's going to come next. That's part of the definition of what a pattern is.

Marley: Another good example is the regular changing of the seasons. That's absolutely a pattern, and, really, once you start looking, patterns are everywhere.

Amelia: Right.

It's kind of hard to avoid. One of the ways that adults can help children see math in the everyday is by making note of all of the ways that they themselves already use math and then incorporating that really intentionally into their daily language.

Just like one might name a color or an animal in a book – “Oh, it's the blue bunny!” – math can be incorporated into daily language in much the same way, and we can start that even when children are quite young.

For young children who are dual language learners, it's important to support home language development. Children who are learning more than one language are building skills in both languages.

Marley: That's right. Learning to count to 10 in a child's home language can be a great way to support language and skill building in more than one language.

Amelia: Right. Children learn skills in their home language first, and so when we start to add another language, it's important to rely on all of those skills that they already have in their home language and use those to help support their learning as they add in this new language.

Marley: Yeah. Exactly.

You might think about modeling, using fingers to count. That can also be used to help support all children who are learning about math. For children learning to count, they're a really great tool.

Amelia: Right.

It's this built-in tool that we all have, and they're in this nice set of 5, and our numeracy system is built on 5's and 10's, and so it's a really nice way to think about interacting with the world and with math. There's no problem in using your fingers to count.

Marley: Or toes.

Amelia: Yeah. Toes are great, too.

Okay, so we've talked about incorporating math into everyday interactions, and while this is really great thinking about that the bunny has two ears instead of saying, "It's a brown bunny," it can be overwhelming to always keep this idea of numbers and math and counting and patterns running in the back of your mind. So, to help us think about breaking this down a little bit, do you have some recommendations for times during the day that are particularly good for math talk?

Marley: As we've said, really, any time is a great time for math, but it can be helpful to help programs identify specific times that they want to focus – at least at first.

Amelia: One time to consider is during playtime. Children naturally use play as a way to explore everything, but they particularly use it as a way to explore mathematical concepts, and, in fact, one study found that preschool-age children explore or use math-related concepts about 50% of the time during free play, and I love that because it suggests that almost half of children's playtime is used exploring and playing mathematically in the world. We are these natural little mathematicians.

Marley: And what's interesting is that another study found that when adults play along, when they're scaffolding and helping guide play with blocks, adults tended to use a lot of math-related language themselves.

Amelia: Right, and as we know, the more math language we as adults can use, the more exposure children are going to get to those math concepts and be able to link what they're doing, which they may not know is a math concept, to this verbalized math concept that the adults are explaining.

And what about infants? What can we do to support infants' budding math skills?

Marley: Yeah, infants are surprisingly good at picking up and noticing patterns. They're constantly observing us and watching what we're doing and predicting our actions or what we're going to do next based on that. This is really a form of probability or statistical analysis.

So, for example, they've probably noticed from their lives of observing us already that hats go on our heads, and if you put a hat on your foot, I bet they would be kind of surprised by this.

Amelia: Right, and this can be a fun game. Children often delight when adults do silly things, like putting a hat on their foot, and if you think about why it is that they find this so funny, it's because they already know that hats don't go on your foot.

They go on your head, and they know that adult is being silly and making a choice to do something out of the ordinary. From all of the statistics that they've taken, they watch many adults put that hat on their head, they notice when an adult puts it on their feet, and they think this is really funny.

Marley: And this is sort of how babies learn about the world around them. I mean, they're born into this unknown world and have to, from such a young age, make observations and identify patterns and probabilities.

Amelia: To support infants in early math, routines or opportunities to try something or repeat an action over and over again can be particularly helpful, right? This is how children learn that a hat always goes on your head because they've seen a hat go on your head over and over and over again.

Children are doing their best to make sense of the world, so providing some predictability or the chance to have an experience multiple times not only helps them learn better, but also helps them solidify their skills in identifying and learning from patterns.

Marley: And just as it's true with older children, using this kind of math language, even if infants are not yet talking, is a really great way to start their lifelong relationship with math.

Amelia: And I love that idea of this lifelong relationship. Math is something that, just like language, we're going to use throughout our life. So, why not start nurturing this relationship, this understanding, this use of math from a very early age?

Marley: So, adults can think about using math as they describe maybe how they're moving within a room, for example. You might say something like, "I'm walking in a circle, --> Display at 00:11:30:02 around we go" while you're carrying an infant, or maybe something like, "I'm walking to the corner of the room now."

You also might consider suggesting that adults use math as they count on their bodies – 10 toes, 2 legs, 1 nose. Adults can demonstrate counting on their own bodies, as well.

Amelia: And this helps children understand their bodies in relationship to other bodies, as well as a fluid sense of how math can be used as a language to explain our world, our bodies, and our experiences.

Today we talked about just a few of the many ways that adults can help young children engage with math.

Marley: In your work supporting programs, consider helping them to see and understand math as a language that can be infused throughout the day. To help programs get started with this task, help them to identify times of the day that they would like to intentionally include more math language. Home visitors can work with families to think about what daily activities and routines are good opportunities to embed math language and exploration. As we talked about, play or free-choice time could be a great place to start.

Amelia: Yeah, and book-reading is another good option.

It's also important to help be conscious of and actively work against stereotypes about who and who doesn't do math. Children are watching, listening, and learning from us from the moment they're born. So, modeling those positive attitudes about math, as well as infusing math throughout the day can go a long way in helping children embrace their inner mathematician.

And this modeling can start with you. Being a good role model, thinking about how you can demonstrate your positive attitude about math for programs can really go a long way in helping to shift this narrative that we're all mathematicians.

We hope that you've enjoyed this series on STEAM. For more information on supporting children's STEAM learning, visit ECLKC and search for "STEAM."

Stay tuned for more "Research on the Go" podcasts that cover new and different topics in child development.

Announcer: Thank you for joining "Head Start Talks."

For more information on what you heard today, visit the Early Childhood Learning and Knowledge Center, or ECLKC at eclkc.ohs.acf.hhs.gov.

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