

Science, Technology, Engineering, Art, and Math (STEAM) for Everyone

Rilee Larsen: Hi, everyone. Welcome to the second in our series of inclusion webinars, STEAM for Everyone. This webinar was created specifically with disabilities coordinators, mental health consultants, and educators in mind. I'm happy to introduce our presenters today, Jessica Hardy of the University of Illinois at Urbana-Champaign, and, Jani Kozlowski, from the National Center on Early Childhood Development, Teaching, and Learning.

Jani Kozlowski: Welcome to the STEAM for Everyone webinar. We're so glad that y'all can join us. I'm Jani Kozlowski, the Inclusion and Professional Development Systems specialist here at National Center on Early Childhood Development, Teaching, and Learning. I'm excited to welcome our expert presenter, Dr. Jessica Hardy, to our inclusion webinar series. Jessica, can you share a little bit about yourself with the group?

Dr. Jessica Hardy: Sure, Jani. I'm Jessica Hardy. I'm an assistant professor of early childhood special education at the University of Illinois at Urbana-Champaign. I do research in math and science learning for children with disabilities. I also was once a Head Start teacher and a preschool special education teacher.

Jani: I just love it that you have experience in the classroom, Jessica. We feel so lucky to have you with us to share some practical strategies and perspectives that you bring, in addition to your research expertise. So, let's get started by sharing our agenda for the session. The first item on our agenda is to briefly discuss what we mean by STEAM.

We'll share information about the key components of high-quality inclusion, the house framework, and how it all relates to STEAM, and then we'll spend the bulk of our time talking about strategies for supporting success for children with disabilities in STEAM, and we'll end with sharing some resource links for you to visit these and extend your learning.

Our objectives today are for you to be able to describe what STEAM is and why it's important for children with disabilities, to describe strategies for supporting children with disabilities or suspected delays in STEAM activities, and reflect on how high-quality inclusive practices can support STEAM learning.

This webinar is a perfect companion to the other STEAM-related activities that we have going on with DTL. Jessica, we're nearing the end of our Teacher Time series on STEAM, and we've also mailed out some STEAM boxes of resources to every Head Start program education manager, so the folks out there have been learning a lot about these concepts, and they're ready to expand this learning to think about children with disabilities or suspected delays.

So, just to make sure that we're all on the same page, let's first talk about what we mean by STEAM and why it's important for children with disabilities. Jessica, you were sharing with me that the best way to describe it is by telling a story about it, right?

Jessica: That's right, Jani. Consider this scenario: Becka is a Head Start teacher who would like to incorporate more STEAM teaching in her preschool classroom.

She has heard a lot about STEAM in recent years, but she's unsure of what types of activities and instruction are considered STEAM. For example, she has a science center, is that STEAM? Becca explores more about STEAM, and she learns that it stands for Science, Technology, Engineering, Art, and Math. She also learns that in early childhood context, STEAM activities should focus on giving children opportunities to explore and experiment to help them build knowledge and concepts and to communicate about their burgeoning understanding. There are many types of STEAM activities.

For example, Becca could design a sequence of activities to encourage children to design, create, and evaluate block structures. First, Becca could observe how her children are using blocks to build. Then she could introduce some concepts that would help children develop more advanced structures, such as the importance of having a stable base to your block structure.

Then Becca could introduce the idea of creating blueprints to plan structures. As children explore using blueprints, Becca could encourage them to evaluate their structures and revise their plans, so it's important for teachers to know that there are many resources available to help design high-quality STEAM activities. Examples are included on the handout provided in the resource widget.

Jani: That's really great to know. Thanks for describing what STEAM is, but why is STEAM important for children with disabilities?

Jessica: That's a great question. So, there are a variety of reasons. First, it facilitates children's inclusion in typical activities that are based on exploration and discovery.

This allows for an individualized approach. Participating in STEAM activities also helps children develop relationships with peers, and early exposure to STEAM allows children to access important academic content which will support their later school achievement and success in community and work session study. So, design STEAM activities and instruction for children with diverse needs, including children with disabilities, teachers must understand the three components of high-quality inclusion.

Jani: Such great points, and that one focus on block structures can be used from young infants to explore blocks, their characteristics and textures, and used right up through preschool, as you suggested, by adding the planning and designing to block structure process. I loved how that exemplifies that STEAM is for children of all ages and all abilities. So, Jessica, before we get started, I'd like to share the framework that we've been using in Head Start to describe what we mean by high-quality inclusion. That sound good?

Jessica: That sounds great, Jani.

Jani: Well, Head Start has followed the lead of two leading professional organizations for early childhood education and early childhood special education: the National Association for the Education of Young Children, and the Division for Early Childhood of the Council for Exceptional Children. In 2009, they created a joint position paper on high-quality inclusion, and it emphasized three components: access, participation, and supports.

Access means that children with disabilities are welcomed and accommodated in typical educational settings, and that these settings provide activities and instructions designed to meet all children's needs. Participation means that children's engagement is supported through the use of high-quality instruction and accommodation, and supports refer to system and program-level policies and procedures designed to support inclusive services, like incentives for programs to include children with disabilities, integrated delivery of therapy such as physical therapy and speech services, and that's further emphasized in the framework for effective teaching practices.

Y'all will be very familiar with this. This is our — the house framework. We use this house framework to depict how effective teaching practices fit into the entire system that we have within Head Start. The house represents five integral components of quality teaching and learning. We have the foundation that provides for nurturing, responsive, and effective interactions and engaging environments for children. The first pillar is about choosing and implementing research-based curricula and teaching practices.

The second pillar is using screening and ongoing assessment of children's skills, and the roof is about individualized teaching and learning, and of course parents and families are at the center of the house. When connected with one another, all of these form a single structure, and that surrounds the family in the center because as we implement each component of the house in partnership with parents and families, we foster children's learning and development. So, what does the house have to do with high-quality inclusion, you might be asking? If we're using the house, we're ensuring that all children are receiving what they need to learn and grow.

Additionally, we want to highlight one aspect of the house that is essential for high-quality inclusion for children with disabilities: the roof. The roof represents highly individualized teaching and learning. This may be necessary for a child who is typically developing but is essential for children with disabilities. Highly individualized teaching and learning means we provide curriculum modifications to help all children participate. It also means that we provide intensive instruction to help children learn. So, we designed STEAM for all, we need to remember these things.

What's important about STEAM activities is exploration, experimentation, and communication. We need to remember what high-quality inclusion looks like, remember access, participation, and supports, and we need to remember what the house entails, including the roof of the house, and that's highly individualized teaching and learning. This is a really big task. So, Jessica, how can we make this concrete so that we can support success for children with disabilities in STEAM?

Jessica: Well, that's a great question. I'd like to share some strategies for supporting children with disabilities. These strategies are effective for different types of curriculum content, but we will provide examples specifically related to STEAM.

Jani: That sounds great.

Jessica: So, the strategies for supporting success are to: 1) ensure access; 2) support engagement; 3) consider specific learning needs; and 4) use teaching loops, and we'll talk about each one of these.

Ensuring access means first that we should involve all children, not only at the programmatic level as described earlier, but also at the activity level. No child should be excluded from activities because of their disability or because of their behavior. We must design activities that all children can be a part of. Teachers also should consider their grouping.

It is recommended to provide STEAM activities primarily in small groups, pairs of children, or activities based around existing learning centers. This is because using large-group activities can sometimes be overwhelming for children or involve lots of downtime while children wait to take a turn. In Becka's classroom, she has a child, Sammy, who receives private and physical therapy at the same time every week, which coincides with Becka's STEAM lab time.

Becka realized this prevented Sammy from accessing STEAM activities, so she decided to plan additional time for her children, including Sammy, to engage in the STEAM lab activities. As part of ensuring access, teachers should monitor whether all children are accessing the STEAM-related centers. This can be done through the use of a simple participation chart.

A participation chart is a table where teachers record which children visit which centers. This can be done for all centers, or it can be used only for STEAM-related centers, like the one shown. The teachers record the initials of the children who spend time in the centers. When looked at across one or more weeks, this can provide information about whether some children are avoiding the center.

If some children are avoiding a center, it could be because they don't know how to use the materials in the center. This should signal to the teacher to provide additional instruction or support. This strategy can be adapted and used in other settings and with a variety of age groups as well. In Becka's class, she realized that one child, Manuel, was not going to the science and math centers in her classroom.

After considering Manuel's personal characteristics and learning needs, she hypothesized that perhaps the science and math centers were a bit overwhelming for Manuel. She noticed that he usually preferred structured, quiet activities. The science and math centers were popular and often got noisy and busy. She decided to provide more visuals to support children, including Manuel, in understanding the activities available in the math and science centers. She also made a point to be at the science and math centers with Manuel to help monitor the noise level and provide him with adult support to engage successfully.

Jani: Well, Becka really did do a lot to ensure access for Manuel. You know, when we think about access, it really is a layered concept. Access into buildings or public spaces, access to ensure participation in activities, and we've got a video that is an example of access to the actual learning materials. This short video clip that we're going to play shows a little boy named David. He's an infant with limited motor ability. His mom and his therapist wanted to make sure that David had access to block play, and so, they found a really creative way to give him that opportunity. Let's watch.

[Video begins]

[Video ends]

Jessica: ... with David, it's a great example for how to make STEAM activities accessible for all children, including infants and toddlers with disabilities. We really do have to get creative and consider the needs of each individual child.

Jani: That's such a good point, Jessica. You know, you also mentioned the role that education staff can play when encouraging engagement in STEAM activities. Can you tell us some more about that?

Jessica: Sure. As you said, teachers also must make sure children with disabilities engagement is supported in STEAM activities. The first way this can be done is by ensuring children know how to use material. For example, in Becka's classroom, they do an activity that involves mixing water with different materials such as toilet paper. For this activity, children were expected to pour water into a container.

The teacher first had to make sure that all her children could do this. After teaching material use, teachers must give children the opportunity to use the materials, even if it's easier if the teacher just does it herself. For home visitors and home-based programs, this activity is also one that can be done easily at home using materials found in most homes. All you need is toilet paper, water, a container, and a spoon.

Jani: I just love that, and I'm sure that that toilet paper mush activity is one that also gets lots of laughs from children and parents.

Jessica: It sure does.

Jani: Teachers should also consider how visuals can be used to support engagement. When Becka experimented with toilet paper and water, she asked children to make predictions. She created a visual that some of her children used to make predictions. One picture showed the toilet paper staying the same, and the other showed the toilet paper getting mushy.

These visuals allowed for the children to participate in making predictions and to be engaged in the activities. In fact, using visuals is a great strategy, and you'll see that used in different ways throughout this webinar. Can you give us another example, Jessica?

Jessica: Absolutely, and using visuals is one of my favorite strategies to use with young children. So, in this other example, Adrian's inclusive preschool classroom did a cooking unit – a cooking unit of study for six weeks. In week four, they chose ingredients to make their own creation. Each ingredient had a visual. The children ordered the visuals on a piece of paper.

They predicted what their creation would look, feel, and taste like based on the items they chose, and as they chose items, they tasted them and indicated how many scoops they wanted by choosing a number visual. Teachers also should provide ample opportunities for children to make choices. Providing choices allows children to demonstrate their preferences, and it gives them a sense of agency. In Becka's mixing activity, the toilet paper mush, as children came into the activity, she encouraged them to choose between the different utensils available for mixing.

Jani: That's a great strategy, and often we find that engagement happens when the strategies are paired with peer support, don't you think? Children who typically might not engage with STEAM activities on their own are often more likely to do so when they're paired with a peer.

These examples that you gave really lend themselves to this notion of pairing children together so that they can learn from one another as well.

Jessica: That's a great point, especially if you have a child with some social-emotional learning needs as well. As we know, teachers really need to consider children's specific learning needs.

First, they should consider whether the activity has the right amount of structure. For some children, free exploration is overwhelming, and they need more support to engage in activities, especially new and unfamiliar activities. If this is the case, teachers can provide a visual of the steps of the activity or ensure that an adult is there with that child to provide more structure and support.

For example, in an activity where children are experimenting with directing movement with a pendulum to knock down towers, the teacher might provide a visual of the activity sequence, as you see on the slide. Using a target pendulum seems like a complicated activity, but it can be done with a few common, everyday materials.

This is especially helpful for home visitors who are working with families to integrate STEAM learning for their children. A family member just needs two chairs, a dowel, or a broomstick to put across the chairs, twine or string to hang from the dowel, an empty bottle filled with sand or any other substance that gives the bottle weight, and boxes or plastic cups to knock down. This is a great activity because it can be used in the classroom or in the home during a home visit.

Jani: That's right. It really uses everyday materials, and that really looks like a lot of fun.

Jessica: It absolutely is. Teachers should also ensure that all children can use the physical materials. If any children cannot, different materials should be provided or the existing materials should be modified. For example, these utensils have been modified by adding a foam piece to make them easier to grip.

Jani: That's really a good point. You know, the strategy of modifying materials is one that we highlight in our Curriculum Modifications in-service suite on the ECLKC. We link to that suite on the resources slide at the end of this webinar, and it gives some great examples of ways that you can modify curriculum.

Another example of this strategy from the suite is that the paintbrush in the photo on the right is larger and easier to grasp, and then the educator also is using bright colors to support a child with visual impairment. In another example, a child with a visual impairment who's participating in a math activity might need materials placed on a light table to allow him to more easily see and manipulate the materials, so it's really about figuring out creatively how to make the materials work for the individual child.

Next, we're going to show you a video that shows some toddlers playing with foam blocks, which can be easier to grab for a child with motor delays or impairments. The same concepts are taught at very early ages just by giving children experiences with the material. This teacher in the video has a discussion with the children about the color of the blocks, which is great, but as you watch, think about other STEAM concepts that she could be teaching as well.

[Video begins]

[Video ends]

Jani: I just love that clip. You know, in addition to the foam blocks being easier to grab, they can also be played with on a tabletop without concerns about sliding off. So, at the resources slide at the end, check it out because there's other video clips that we'll have on there that show this and some other strategies as well.

Jessica: That's a great example, Jani. In addition, when considering specific learning needs, one of the most important things a teacher can do is consider how children can communicate in STEAM activities. Children might need support to understand language, such as directions, about how to do an activity. Children might also need support to help them express what they know and what they think.

For example, in Marina's classroom, she provided an activity to encourage children to experiment with a balance scale. After experimenting with the scale, she asked children to report what they learned. Some children shared verbally; some children pointed to what was heavier or lighter when asked, and some children used the picture communication notebook. It's important to provide opportunities for children to communicate in diverse ways.

Jani: So, given that children might need support to help them express what they know and think, we can consider assistive technology options as well. Right here is a photo of Luke using an assistive technology device to communicate with his teachers and friends.

Jessica: That's a great point and a great example. So, now let's consider what this might look like in our final strategy, the teaching loop.

Jani: Excellent. This is another concept that will be really familiar to Head Start folks: the Teaching Loop. We talked about it – about using teaching loops to support children who are typically developing and children who may need highly individualized support. How can we think about this strategy as it relates to STEAM activities, Jessica?

Jessica: Well, as you said, teaching loops are essential to providing instruction for children with disabilities for all areas of development, including those related to STEAM activities. Teaching loops begin with providing a cue. This signals to the child to perform a behavior. Then the adult, the teacher, home visitors, and parents or a family child care provider provides assistance to help the child demonstrate the behavior correctly. Then, the adult observes the child's response.

Finally, the adult provides feedback on the child's response. Let's look at an example. Home visitors can model the use of teaching loops for families during home visits, so that families can learn to provide these cues, offer assistance, and observe for a response. In this example, the child is using a balance scale. The teacher says, "Put the silver block in the balance scale." That is the cue for the child. Then, the teacher provides assistance by modeling the behavior. Then, the teacher observes the child putting the block in the balance scale. The teacher provides immediate feedback by saying, "Nice work! You put the block in!"

Now, it's important to note that this is just one step of a multi-step task of using the balance scale, and over time, as the child learns the behavior, the teacher should provide less and less assistance to allow the child to complete the behavior independently. Here is another example.

In this example, the teacher is helping the child experiment with directing movement and force by swinging a pendulum to knock down boxes. The cue the teacher provides is, "Swing the pendulum."

The assistance the teacher provides is physical. The teacher observes the child swing the pendulum and then, provides feedback by saying, "Great job swinging the pendulum! The boxes fell down." In this example, the children have been experimenting with rolling cars down ramps. This teacher is helping the child communicate what they know. She cues the child by saying, "What happens when you push the car from the top of the ramp?"

Then she provides assistance by modeling the answer, "The car rolls down the ramp." She observes the child's response, which is to say, "Cars roll down." She provides feedback by saying, "That's right. It rolls down!" Finally, here is an example of using a teaching loop with toddlers. In this case, the children are playing at a water table.

This teacher is helping the child explore the water. She cues the child by saying, "Pour the water." She then models this behavior by scooping and pouring the water out. The child then scoops the water and pours it out. Then, the teacher provides feedback by saying, "You poured the water out of the bottle. The bottle is empty!"

Jani: I really love this approach because it breaks down those practices into steps that are easy to follow. You know, this step-by-step approach really makes sense to me, but it must require some planning, right?

Jessica: Yes, that's exactly right. Teaching loops must be planned carefully. Decisions must be made about what behaviors to focus instruction on, what cues to use, what assistance to provide, and what feedback to provide, and for more complex, multi-step behaviors, multiple different teaching loops are used one right after another.

For example, when teaching a child to use the balance scale, the first teaching loop might be to put the heavy silver block on the scale, as was shown on an earlier example. This next step might need to put colored objects on the other side of the scale to try to balance the silver block. The third step might be to count how many color blocks it took to balance the silver block. A teaching loop should be used for each step in this process.

Additionally, multiple opportunities to practice are needed for a child to learn the behaviors, so the teacher must decide when and how often to provide instruction using teaching loops. Multiple practice opportunities can be provided in one activity across the day or across multiple days. A teaching loop planning sheet is included as a handout and is described next.

Jani: We have that teaching loop handout in the resources widget. Isn't that right?

Jessica: Yes, that's absolutely right, and we have a closeup of the loop right here; so, you can use this handout to plan teaching loops, and you can download the handout from the resources widget. First, to use the planning sheet, you first determine how many steps are in the task you are teaching. If it is multi-step, you should list each step in the first column. In the example shown from Becka's classroom, which involves mixing toilet paper and water to make toilet paper mush, the steps are predicting, putting toilet paper in the bowl, adding water, mixing, communicating results, and evaluating the prediction.

So, for example, the cue for predicting might be, "Make a prediction. What will happen when we mix toilet paper and water? Point to the picture." Then, you must decide what types of assistance you will provide. The assistance you provide will depend on what the child needs and what makes sense for the behavior. In this example, Becka decided to provide a gesture or point as the assistance. For example, if she provided the cue, "Mix it up," she then provided assistance by pointing to the spoon.

The planning sheet should also be used to plan what types of feedback to provide. For correct responses, some type of positive feedback should be used, such as descriptive praise. For incorrect or no responses, the teacher can plan to repeat the assistance or provide more intensive assistance. The latter is what Becka decided to do. If the child didn't respond to the pointing assistance, she decided to provide hand-over-hand assistance. Teachers can also use the planning sheet to decide where, when, and how often to provide instruction. So, Becka decided to provide instruction twice a day at the science center — once in the morning center time and once in the afternoon center time.

Next, teachers must implement teaching loops as planned. Teachers should provide the instruction and collect data on the child's responses. Collecting data should ideally be done anytime instruction is provided. If that's not possible, teachers can collect data approximately every other time instruction is provided. Data can be collected many ways, but we have included a data collection sheet as a handout. This sheet is designed to allow you to collect data on the child's responses for each step of the task you are teaching and across multiple sessions for days. Let's look at an example from Becka's classroom.

This data collection sheet has each step of the toilet paper mixing task, which you can see where the arrows are pointing. Each time the teacher collects data, she writes the date. Then she writes what the child's behavior was for each step. The choices are "C" for correct without assistance, "A" for correct with assistance, and "I" for incorrect with assistance. Below the date, she writes the applicable letter. At the end of the day, the teacher can mark how many of each response there were. In this example, for the first day, there were five out of six correct with assistance responses, and one correct without assistance.

Periodically, the teacher should review the data collection sheets to determine if the child is making progress. Progress is observed if the child needs less assistance over time to make correct responses. There should be few, if any, "I" responses; decreasing amounts of "A" responses, that's with assistance; and increasing amounts of correct responses, "C." This is what Becka observed, as can be seen by the data. Correct responses are going up from zero at the beginning of the week to five at the end of the week. Also, as part of evaluating teaching loops, teachers should monitor their own implementation of teaching loops. This can be done using the teaching loop checklist, which is provided as a handout. This checklist can be used periodically by teachers to make sure they are using teaching loops as intended.

Jani: If that's missing, those record-keeping devices really helps teachers to see progress in the work that they're doing. You know, these are really great resources, Jessica. I think they're really helpful for breaking down all of the teaching practices into smaller steps, too, and for remembering everything that you're supposed to be doing, right?

Jessica: Absolutely. It can be a lot to remember. So, we're going to review.

So, to summarize, the strategies for supporting success for children with disabilities in STEAM are to ensure access, support engagement, consider specific learning needs, and use teaching loops. We shared specific ways teachers can do that, which is illustrated here, and this is also provided on a handout that you can download from the resources widget.

Jani: That's a really helpful summary. Thank you, Jessica. Gosh, I've learned so much during this webinar, and I'm wondering, we might have some questions that we can answer from the group. So, Rilee, are there questions from the Q&A that we can discuss together before we close out?

Rilee: Hi. I'm seeing some questions, just looking at the resources, that will be on the list, just wondering what will be there, so I think there's a lot of curiosity about the resources that you're about to discuss, particularly some people are looking for the monitor participation record sheet and the data collection handout that you mentioned.

Jani: Hmm, OK. There must be some ... Maybe, there's a problem with the uploading of those resources.

Rilee: OK. Yeah, we can ...

Jessica: It looks like ...

Rilee: Go ahead.

Jessica: It looks like a couple people are having trouble seeing the resources, but they're being helped. So, if you're having trouble, just let us know in the Q&A, and we can make sure that you get access to them.

Rilee: Sounds good. Thank you.

Jani: Jessica, I have a question.

Jessica: Sure.

Jani: When you were doing this work with kids, and, you know, you mentioned the pendulum activity in particular, what kinds of helpful hints or lessons did you learn when using that activity with children? What were some of the things that came up through that experience?

Jessica: Yeah, that's a great question. I have used that particular activity in my – I used it in my classroom when I was a teacher, and I've also used it as research.

And so, I think the things that are important to remember are, first, for any child, you want to allow lots of time for exploration, so for children to use the materials, to enjoy playing with them, but we also want to make sure that all of our children, including our children with disabilities, have time to access — have opportunities and time to access the STEAM content of the activity.

So, for example, when using the target pendulum, it's a giant cause-and-effect toy, right? So, it's automatically fun to play with. But we want to help children have fun with STEAM materials but also learn some of the science behind it; so, that's where things like the teaching loops might come in, to provide a little bit more structure and purposeful support to the children to

engage in that activity. So, I think having a balance of pure child-directed exploration but also time for the teacher to do some specific instruction along with that activity so children can get to know the science content behind it. Does that make sense, Jani?

Jani: Yeah. Yeah, that really does. I think, you know, having that time, and your point about exploring materials is really important because children learn through play, you know; and so, it has to be somewhat open-ended. There's a question from Kimberly about the balance scale that you have in the picture.

Jessica: Mm-hmm.

Jani: She's wondering where you can get it.

Jessica: The balance scale?

Jani: Mm-hmm.

Jessica: The balance scale ... Oh, I think that I got it from Discount School Supply or from Lakeshore. I think either one of those should have a similar or the exact balance scale. And I also have – we have the visuals. I have examples of the visuals for all of the ones we've shared. So, if the visuals are things people are interested in, we can also follow up with some of those as well.

Jani: OK. That'd be great. So, you know, there is another question here from Jennifer. You know, she's really excited about using STEAM centers, but she's concerned that the teaching loops are really adult-directed, and she's wondering, what if the child isn't interested in the activity, or if the child is interested in exploring the water, or the dry toilet paper in that example?

What would you do in that case?

Jessica: Yeah. That's a really, really good question, and so, I think that we should always be guided by children's interest, and the great thing about STEAM activities is they're almost always interesting to children, and so – and to a variety of children, children who have disabilities, and children who don't have disabilities. So, it's not that I would take a child who's playing at the water table and say, "Come over here. Let's do a teaching loop on the balance scales."

I would look at what the child is engaged in, and I would use a teaching loop to help move their – to help support their engagement and help them use the materials and help them learn the science content. So, I absolutely agree that we don't want to be – we don't want to be ignoring where children's attention are directed at.

So, if a child is – for example, if a child is interested in transferring water between vessels, if the pouring water down tubes, then use a teaching loop with that, so really be guided by what the child is interested in. And so, this might mean that, as a teacher, you have the STEAM center available, and you observe for the first couple days, and you see how children are using it. And then, the next couple days, you plan how you're going to use teaching loops based on the observations you've made.

Jani: That makes a lot of sense. You know, I think it's really, in particular, trying to help a child reach a goal, you know, whether that's from an IEP or whether that's just from your own observations as a teacher.

Jessica: Mm-hmm.

Jani: Those teaching loops can really help you toward that end as well.

Jessica: Absolutely.

Jani: Yeah, Brittany was asking about the swing game. She really loves that game, but she has a really small classroom; she doesn't have a lot of room. Do you have any suggestions for how to do that activity on a smaller scale?

Jessica: Absolutely. So, I have used that activity in different spaces, and I will say that it can be done in a very small space because I have done it in a very small space. So, my recommendations for that are to consider, you know, the size of the materials that you're knocking down, for lack of a better word, so it's plastic cups versus boxes. So, if it's smaller space, perhaps smaller materials.

You would want to maybe practice yourself first to make sure you have the string that's holding the weight is the appropriate length for the space to really swing. And I think the other thing is, if you have a small space, you might have to limit the number of children that can be there at one time in order for children to really get a chance to explore and use that activity. But I think the important thing is to get started, to try it out. If it doesn't work, well, you've got some experience that can be used to inform you the next time you try it.

Jani: That makes a lot of sense. We have a comment in the Q&A about the tone of voice that you use in the classroom, and I'm curious: Do you have any thoughts about a tone of voice that teachers can use to really encourage curiosity among children?

Jessica: Yeah. That's an interesting point I hadn't really thought of. I think, in general, with STEAM activities, using lots of, "I wonder if," or having that type of language and tone, that idea of curiosity and of being OK with making mistakes I think is really important for teachers to model, and I think when it comes to using teaching loops, making sure that you're being really positive, supportive, that you're not being punitive with the child if they need help or being upset with them if they don't do it right themselves.

Of course, you want to always be supportive; so, I think whether you are helping children explore and explore their own curiosity and experiment and make mistakes, or whether you're using teaching loops, be mindful of how you're talking; the language you're using and the tone you're using is really important.

Jani: Yeah, you know, I noticed that really encouraging tone that the teachers used in the video clips that we showed as well. You know, there was a lot of enthusiasm and encouragement in their voices, and I think that – that really helped.

Jessica: Absolutely.

Jani: Yeah, Bonnie suggested that teachers should use a voice that is the way that they'd like to be spoken to, which I think makes sense, too.

Jessica: Absolutely, and especially with children with disabilities, I think sometimes we can – sometimes adults or other children can use more of the baby voice or things like that, and so, we want to make sure our language is respectful of all children and that we don't baby children with disabilities.

Jani: That's right. You know, we need to have high expectations for all children.

Jessica: Absolutely. Absolutely.

Jani: Yeah.

Jessica: I also saw there was a question about whether the material presented is part of a curriculum, and it is not part of a curriculum. I have just done a lot of research related to STEAM activities and was very passionate about it when I was a classroom teacher. So, there're ideas that have been pulled from different places, different books for teachers, or activity ideas, but it's not a set curriculum.

Jani: OK. That's good to know.

Jessica: Mm-hmm.

Jani: You know, and there are a lot of comments about starting with children's interest as well, and I think that is definitely a kind of curriculum modification that really works for children with disabilities.

Jessica: Absolutely.

Jani: You know, that starting with where children are. Do you have any experience with using any of these activities outside? There's some questions around outdoor STEAM activities.

Jessica: Oh, that's a great question. So, I think that most of these activities, going outside would only help them because it would give you more space. It would allow you to be less concerned about messiness. So, I think using these activities outside is a great idea, and giving children lots of space to move around is always a good strategy.

For example, in my classroom, I had a large classroom, so I was able to do a lot of these activities in my classroom, but one of the things that we did, I had a little girl who was – she used, not a wheelchair, but something similar where she kind of wheeled herself. It was a cart that was low to the ground, so it was kind of on floor level, so she could engage and play with other children when they were on the carpet.

And one of the things we did with the target pendulum activity, one of her IEP goals was working on wheeling herself in that cart more effectively; and so, instead of using the target pendulum to knock down the boxes, we had her aim at the boxes and try to knock them down by using her mobility device. So, that's the type of thing that can absolutely be done even easier outdoors, and I think really being creative about how you use materials and how you structure activities to allow for those different types of uses can really be important.

Jani: That's a great example. Maureen has this idea of using an outdoor basketball hoop to make the pendulum. What do you think about that idea?

Jessica: Oh, that's a great idea. I've hung the pendulum from a ceiling; I've hung it from chairs. I think a basketball hoop would be a great idea, and that really goes to show that teachers are really good at being creative with the materials they have, and that's one of the beauties of STEAM is that it really allows you to be creative.

Jani: Absolutely. I love that idea, too. You know, I was thinking about children's preferences as a way to engage them, and I remember a child in my class when I was a preschool teacher that had some pretty significant behavior challenges, but one of the things that he really loved were dinosaurs, and so, we made everything about dinosaurs. You know, and I was thinking about the block activity, that that could be dinosaur caves for this child, you know, coming up with ways that they can engage with STEAM materials, but on any topic whatsoever that they're interested in.

Jessica: Absolutely, and that speaks to a question another audience member had, "What if materials you take do not interest the child or the child shows no interest in the activity planned, but it's an activity based on an ISSP goal?" And so this is a very real question that teachers face, and so, whenever I had an activity that kind of bombed or failed or children weren't interested in, or a specific child wasn't interested in, I really used that as an opportunity, or tried to remind myself to use that as an opportunity to think about – to use that as feedback, so that means that there's something that needs to change about the activity or something that needs to change about my instruction.

So, it might be that I need to make the activity more enticing to children. It might be that the child really doesn't know what to do or is frustrated with their performance in that activity, so instead they just want to leave it alone. So, I think what you can do is really try to find a way to, as you were just saying, build on children's preferences, build on children's interests, and find a way to build those preferences into the existing activity or change the existing activity to better match – to better support children's engagement, and that's not an easy task, but it is an essential one if we want children to make progress on their ISSP or IEP goals.

Jani: That's a really good point. You know, thinking, being reflective as a teacher and thinking about, "How can I make this more engaging?" and also that, what I like to think of as the Goldilocks place, you know, that place that is not too easy and not too hard because none of us like to do things that are way too hard for us, but we also want children to be challenged, so you're right. Finding that happy spot is difficult, but so important.

Jessica: Absolutely, and it's important, I think too, as a teacher, not to be discouraged if something doesn't happen as planned or if a child isn't engaged in the activity. It's really, as I said before, it's feedback for you. It's feedback for you to use to adjust for later that day or for the next day or for the next week.

Jani: Yeah. That's a good point. You know, I thought this was an interesting comment that Melissa made, and when she said she loves it when the kids — she's a pre-K teacher — and she loves it when — or the kids love it when she tells them she doesn't know what the outcome will be. They love knowing that even though she's the teacher, that she's still learning alongside them, and I think that's part of the fun, you know, that discovery that we can do together with children.

Jessica: Yeah, I would agree completely. It's part of modeling what it's like to be a scientist is you try things out, and you don't know what's going to happen always, and that discovery is really a joy and is, again, a good tradition of a scientist.

Jani: Yeah. Good point.

Jessica: There was also, if we have time for one more question ...

Jani: Yeah.

Jessica: There was a question about implementing these strategies with a classroom only serving children with disabilities and whether teaching loops work with a full classroom or they're more individualized.

And so, when I was a teacher, as I said, I first was a Head Start teacher, and then I taught in a pre-K specialized classroom, I was able to use teaching loops in my classroom, and it doesn't mean that you're giving every child a teaching loop every minute, but it means that you're being strategic about thinking, "OK, this is the morning that I'm going to focus on helping Sammy understand how to engage in this toilet paper mush activity by using teaching loops," and maybe in the latter part of the activity, you're going to help Wanda, and maybe the next day, you're going to help another two children.

So, I think not getting overwhelmed is important. Start small and build up, and as you start using teaching loops, you'll really find they come very, very naturally as you get more experience with them.

Jani: That's a great point. Well, you know, I hope that all the participants have been able to take away a nugget or two. I know that I have. And to extend your learning, we'd also like to share some resource links to resources that you can find on the ECLKC and beyond. So, here are some of the resources that we mentioned during the webinar.

For example, we talked a lot about modifying the curriculum, curriculum modifications that can be used to support STEAM activities and the Curriculum Modifications In-Service Suite is the first resource link here. And we also have a resource coming out around curriculum modifications for infants and toddlers, so be on the lookout for that. And here we have some links to other helpful websites beyond ECLKC.

If you're interested in checking out the video clip examples, you can find lots of video examples on all of these sites. And just a reminder, we do have our final webinar in the inclusion series that will be coming up, so mark your calendar for July 21 from 3 to 4 p.m. And we're excited to have you join us for that final webinar as well. And last, we'd like to share some information about one of our partners.

This is the STEMIIEE Center. It stands for Science, Technology, Engineering, and Math, Innovations for Inclusion in Early Education. So, it's a specific site and a specific project for STEM for children with disabilities. You can connect with STEMIIEE on their website, but they also have a Facebook page and a Twitter handle, and there's also a STEMIIEE community that you can join to connect with others, and I'd love it if we could have some STEM questions and answers on a MyPeers inclusion community as well. I know that Rilee has posted some

resources and questions about the inclusion community and about STEM on that inclusion community.

So, at this point, Jessica, I want to first of all give a shout-out to you, a big thank you. Thanks so much for sharing your expertise with us, and thanks to all the participants out there.

Thanks for joining us.