Little Scientists: Exploring SCIENCE with Preschoolers

Treshawn Anderson: Hi everyone, and welcome to "Teacher Time." I'm Treshawn Anderson, and I'm from the National Center on Early Childhood Development, Teaching, and Learning. And I'm so excited to be here today to talk about exploring science with preschoolers. So, joining me today is Judi Stevenson-Garcia. Hey, Judi, how are you doing? Can you tell us a little bit more about what our viewers can expect on "Teacher Time" this season, especially for those that are joining us for the first time?

Judi Stevenson-Garcia: Hi, Treshawn, and hello to everyone who's joined us today. We're so excited to be back for another season of "Teacher Time," and we're so glad you've joined us. This season, we're going to be focusing on STEAM. And I know a lot of you are already familiar with STEAM. So, for those of you who aren't, the letters stand for science, technology, engineering, the arts, and math.

And so, what we're going to do is, we're going to spend each episode focused on one of those components, and then, we're going to weave the arts throughout each episode. Because we know the arts are really important in terms of supporting children's creative thinking, and problem-solving, and helping them to express their thoughts and ideas in new ways. So, of course, you're welcome to join us for every episode, but you may just decide to join us for the episodes that are focused on the age group of the children that you work with each day.

Treshawn: Thanks for getting us all set up, Judi. It sounds like this season is going to be so exciting. And you know what? As a way to continue this excitement, and celebrate our theme of STEAM, our team has sent every education manager a STEAM celebration box. And this box contains lots of resources that'll support you in using STEAM all year long. And we had a lot of fun pulling together these resources, and we even added some fun things to the box, as well.

So, be sure to ask your ed manager about it if you haven't seen it already. And we're also going to post the STEAM celebration box materials in a special folder on MyPeers, in the "Teacher Time" community, so that you can access it there, as well.

And so, also this season, we brought back our Q&A facilitator, Jan Greenberg. Hey, Jan. She'll be here to talk to you, and to answer any of your questions that you have through that purple Q&A widget. And also, we brought back one of our guest experts from last season, and the original "Teacher Time" host, Gail Joseph, from the University of Washington. And she'll be here today to talk about activities and some learning experiences that you can use to support STEAM thinking and learning. So, we hope you'll leave this episode with some helpful resources, and maybe some strategies you can use in your programs right away.

Judi: Thanks, Treshawn.

Those STEAM boxes sound fantastic. And I know they're on their way to programs, so hopefully, you all will get a peek into what's inside them really soon. I'm also really excited that Gail is going to be with us. She always brings such great strategies. I know today, she's bringing some tips on how to use books to support scientific thinking with your preschoolers. So, we'll see that in just a little bit. I want to remind you, as always, we have an evaluation link that's going to be

available at the end of this episode. You can click on that link. Please fill out the evaluation. We love hearing from you, and getting your feedback, so that we can keep improving what we're offering here on "Teacher Time." Once you complete that evaluation, you'll also be able to download a certificate of completion. So, you can feel free to do that.

If you happen to be watching with a group of friends, and only one of you registered, then go ahead and forward the evaluation link to all of your friends. They can complete the evaluation, and then, they can download their own certificate of completion.

Treshawn: Thanks, Judi. So, before we begin, I'd like to go over some information regarding the webinar platform, since we'll be using some of the features on this episode. At the bottom of your screen, you'll notice these widgets. And if you have any questions during the episode, you can submit them through the purple Q&A widget, and we'll try to answer your questions before it's over. A copy of today's slide deck — and additional resources — are going to be available in that green resource widget. And so, we encourage you to really download any resources or links that you may find useful.

And lastly, you can find some answers to some common technical issues located in that yellow help widget at the bottom of your screen. Each of these widgets are resizable, and movable, for a customized experience. All you have to do is click on the widget, and move it across your screen by dragging and dropping. Or you can even resize them using those arrows at the top corners. One thing to note that, in order to view the videos today that we're going to use in our webinar, make sure you enable that Adobe Flash Player on your computer, so that you can see and hear the videos when they play.

And then, finally, you know, if you're having trouble with everything, try refreshing your browser by pressing F5 on your keypad. And be sure to log off of your company's VPN, and maybe exit out any other browsers that you may have open. Then, hopefully, you'll have a good experience with us today.

Judi: OK. And then, just a couple more tips for you. This season, we have revised our viewer's guide a little bit. You're going to need it to follow along with our episode each time that we're here together. We've designed it to give you some space to reflect on some of what we're talking about, some of the videos that we're going to be watching, and write down some new ideas or strategies that you'd like to try.

So, during the episode today, we're going to have a few opportunities where we're going to give you a minute to just stop and reflect, write down what you're thinking, and some new ideas that you might have. So, make sure to download the viewer's guide now. You can find it in that green resources widget at the bottom of your screen. And you can either print it out and write in it. It's also a fillable PDF, so that you could just ... If you're at your computer, you can type right into it. So, go ahead and download that now, before we get started. The other thing I want to let you know about is a new widget that we haven't seen before. It's the ideas widget. You can see it's a little yellow light bulb. And what that is, it's a space for us to share some ideas with each other.

We're going to tell you when to use it, though, so that our ideas are very focused and specific. But we're going to get to that a little bit later in the episode, when we're going to ask you to

share some of the great ideas that you have. OK. So now, for today's episode, we're starting with the S in STEAM — which is one of my favorites — science. And it does not take much time working with preschoolers before you realize that they are extremely curious about the world, and they ask a lot of questions. Did you know that 4 year olds ask more questions as a 4 year old than they do at any other time in their life? If you work with 4 year olds, or if you live with 4 year olds, you might not be too surprised to hear this.

Treshawn: No, Judi. I'm definitely not surprised, especially with my 4 year old at home, and all of his thoughtful questions, to say the least. So, why is it important to make sure we support preschool children's natural curiosity? Well, let's start with the Early Learning Outcomes Framework — or, as we like to call it, the ELOF. The ELOF helps teachers and family child care providers really understand child development, and what most children should know and be able to do by the time they finish preschool or are ready to transition to kindergarten.

When we provide science learning opportunities that encourage problem-solving, creativity, and reasoning, we support children's growth and development in all of the ELOF domains. But the domains that are closely tied to science exploration are approaches to learning, language and literacy, and cognition. Because remember, approaches to learning includes children showing interest and curiosity about the world around them. So, it's your role as a teacher and family child care provider to support children in their interests and curiosity, as well.

Judi: That's right. This inquiry — or curiosity — that we see in children has a way of supporting them in understanding the world. And if you observe closely, you'll see 4 year olds approach the world, and the problems that they have, or the things that they're interested in, in a very systematic way. Sometimes, we refer to this as the "scientific method," or the "inquiry cycle." It just involves observing or identifying a problem, asking questions or making predictions, and then trying out those predictions to see what happens, and then spending some time reflecting on it — maybe solving a problem, or going back around to try a new hypothesis. This is the scientific method.

And if you think about it, we use it every day, as well. So, for example, I walk into a room, and I flip the switch on my lamp, and my lamp doesn't work. So, when we observe a problem, usually, what we do is, we move right to a question. Why isn't this lamp working? And so, then, next, we can move to a hypothesis or a prediction about what we think, maybe is the problem. The hypothesis is just going to be your best guess based on the evidence that you have. I'm going to predict that this thing is going to happen based on something that I do. And remember, it doesn't matter if your hypothesis is wrong or right, because if it's wrong, then you're going to have to come back around with a new hypothesis. If it's right, then you may have the answer to your problem.

So, for example, I might think my first prediction is that the light bulb has burned out. So then, I have to a little investigating, right? So, I might make sure that the light bulb is tight enough in the socket, or I might take it out, and look at it to see if it's burned out. I might ... If it's not, if the light bulb seems to be fine — I might then think, "Maybe there's something wrong with the outlet." So, I might check to see if the lamp is plugged in, or, if it is plugged in, maybe I want to plug something else into that same outlet to see if the outlet is working.

So, can you see how this movement through this cycle kind of happens for us on a daily basis? We may be taking it for granted when we're trying to solve problems. But if you observe closely, you'll see that your preschoolers go through this same kind of process every day. And what we want to do, as teachers and those who support preschoolers, is to really help them approach the world in this scientific way, so that they can become expert problem-solvers.

Treshawn: Wow. That's a really great way to think about the scientific method, right? So now, it's time for our first "Teacher Time" video. And we're going to do something a little different this season, where, throughout the episode, we're going to give you opportunities to reflect on what you're seeing, and what you're hearing. So, if you haven't done so already, go ahead and download that viewer's guide in your green resource widget, so that you can follow along with us. And make sure your Adobe media flash player is enabled, so that you can see and hear the videos.

So, we're going to watch a video of children engaged in this inquiry cycle process, and then, we'll give you one "Teacher Time" minute to document some of your observations and reflect on what you noticed. So, as you watch this video, pay close attention to how the children are using the different parts of the inquiry cycle, and how this teacher is supporting children's inquiry, as well. Let's watch.

[Video begins]

Child: There's a lot of them. It tickles.

Teacher: Does it tickle when you touch it?

Child: Yeah. [Indistinct talking]

Teacher: So, when you pick it up, it tickles? [Indistinct talking] Oh, it does tickle. You're right.

Child: My baby one. My baby.

Teacher: How do you know that that's the baby one?

Child: That one is white.

Teacher: It's white. Remember what we talked about during small group time that the roly-polies that are born are white and clear?

[Video ends]

Treshawn: This is such a great video, and honestly kind of brings me back to when I was a kid playing with roly-polies in my grandma's backyard. So now, we're going to give you a "Teacher Time" minute to write down in box one of your viewer's guide what you observed the teacher and children doing and saying that was related to this whole inquiry cycle. Remember, observe, question, predict, explore, and reflect. And when we come back, we'll share with you what we observed, too. Take a minute.

So, how was your "Teacher Time" minute? Well hopefully, you were able to reflect and maybe chat with some co-workers about what you saw. So, here are some things that we noticed. See if you noticed some of the same things, or something different. So first, with observation, the children definitely had a chance to observe the roly-polies very closely, with their hands, and

using the magnifying glasses. And you know what? The teacher also engaged with them, and observed the roly-polies for herself. And then, with regards to asking questions, and making predictions, well, the teacher asked, "Does it tickle when you touch it?" Along with other questions for the children to think about. And then, with exploring, well, there was dirt. There was roly-polies. There were other debris spread out all across the table for lots of children to explore freely.

And then lastly, with reflecting, when that one child found the small roly-poly, the teacher asked the child to reflect by saying, "How do you know that that's a baby one?" And then, she reminded the children of the conversation that they had during circle time about how the baby roly-polies are sometimes white in color. This video is definitely a great example of the use of the inquiry cycle to support children's science learning.

Judi: I love that video. It's definitely one of our "Teacher Time" favorites. So now, let's think a little bit about how you can support science learning with your preschoolers in your program. Here are three steps you can take. First of all, we want to think about providing engaging environments. The second piece is going to be providing nurturing, responsive, and effective interactions. And then finally, offering science-related learning experiences and opportunities.

So first, let's start with engaging environments. What does it mean to have an engaging environment, or to provide an engaging environment? When we think about these types of environments in terms of science and children's approaches to learning, we want environments that are stimulating, and interesting, and encourage children to experiment, or go through that scientific method. So, there's a few things that you can do to make sure your environments are engaging, and that they'll support scientific exploration.

First, you want to make sure you have lots of open-ended materials. Second, make sure you have a variety of materials for children to explore. And then finally, provide materials that are accessible to all of the children that you work with. So, let's dig a little deeper. For open-ended materials, I'm sure some things come right to your mind. For example, you might use cardboard tubes, or boxes, or maybe just some junk materials. These types of materials encourage creativity, investigation, and problem-solving.

The one thing I want you to remember about open-ended materials is that they don't tell children what to do. The children tell the materials what to do. And that's a great way to think about the materials that you offer to children each day, is, how many are really available there where children can just kind of be creative, and use them in their own way?

Treshawn: Next, engaging environments also include a variety of materials to explore. And this doesn't necessarily mean having a whole bunch of stuff out at once. This means, like, changing out the materials every so often that children play with and explore from time to time, 'cause it keeps them interested. Like, have you ever put a new bin of interesting tools in the art area to paint with, or to help shape clay?

And did you notice how excited the children were to try out these new tools? You may also want to provide some familiar materials, too, along with some new ones, for children, as they sometimes are more comfortable playing with materials that they've seen or used before.

Because this is especially true for children who are dual-language learners. When they have access to materials that they are familiar with, then, they feel more confident about exploring.

And, you know, you can even ask parents if they have items at home that they'd be willing to share with the class, like some cooking ingredients, or utensils, or maybe some seeds from the familiar foods that they eat at home. This supports children and families not only in engaging in science, but it also encourages them to share their culture and home life with you.

Judi: And the last thing you want to think about is the accessibility of the materials that you provide. So, if you have open-ended and a wide variety of materials, you want to make sure that all of the children that you're working with can access and use them as independently as possible. So, for example, think about, maybe you have a seed-planting activity, so that you can observe the life cycle with your children. You want to make sure that, when you're planting the seeds, that you have space for children to work. You might think about putting a non-skid mat down on the table, so that the pots aren't sliding around while you're trying to fill them, and add seeds to them.

You could put seeds in a shallow tray, so that children have easier access to them to pick them up and then put them in the pot. And you might also think about the size of the seeds. You want to make sure that you have some that are easier to pick up, like bush beans or other large seeds that will also sprout quickly but are easier for children to access.

So, it's important to think both in the learning opportunities that you provide, and in the materials that you provide, that you are considering the needs of all of the children in your classroom, and the ways that you can provide material so that these children can use the materials as independently as possible.

Treshawn: These are such great points, and we hope you got some ideas about open-ended, varied, and accessible materials. So now, we're going to watch a video of children working in a very engaging environment. And as you watch, look for some of these open-ended, varied, and accessible materials. And also look for the ways in which this one particular child engages in the cycle of inquiry. It's cool. Take a look.

[Video begins]

[Indistinct talking]

Teacher: Yay.

Child: Whoa.

Child: Oh, I got that one.

Teacher: Can I go watch Santiago?

Child: I got it.

Teacher: Here, I'm going to — I'm going to trade with you. Here, Lucy, I'll help you. Lucy.

Child: [Inaudible]

Teacher: OK. Let me see. Show me how you do that. OK. Ready? Uh-oh. What happened?

[Inaudible]

[Video ends]

Treshawn: See? Didn't I tell you this was an engaging environment? All of the materials were nearly open-ended, and there wasn't one particular way to play at all. These materials sparked creativity and imagination. Did you notice the variety of materials, like, from pipes, to cardboard tubes, to marbles and balls of all different sizes? There are so many opportunities for discovery and investigation. And, you know, one of my favorite parts of the video was when the little boy put the marble down the little curvy tube, and it slipped out right away, but he noticed that he could balance the ball in the curve of the tube so that it would stay. That's so amazing.

Lastly, you know, all these materials were accessible to all children. There was enough materials for the children to explore freely, and children of all abilities could actually explore the materials independently. So now, in box two of your viewer's guide, go ahead and write down some of your favorite open-ended materials, and maybe add some things to your wish list. And remember, you don't have to buy new toys. Usually, the best open-ended materials are the ones you can find around the house, like cardboard boxes, paper towel tubes, clean, empty plastic containers with lids, or baskets and bins of cloth and yarn and packaging materials — you know, the whole works.

Next, think about the variety of materials that you have, and how accessible they are. And maybe write down some things that you're doing well, and maybe some areas you need some support in, and we'll give you a "Teacher Time" minute to reflect. Go ahead. Take a minute.

Judi: OK. Welcome back. I hope you had a good opportunity to just brainstorm for a minute or two to think about, maybe, some ideas that you have about materials that you would like to try in your learning environment to make it more engaging, especially supporting children's scientific thinking. So, what we're going to do is we're going to give you the chance to share your great ideas with your colleagues, who are all here with us today. We're going to use the ideas widget.

Remember, I mentioned that at the beginning of the episode? If you look at the bottom of your screen, you'll see that little widget with a light bulb. That's our ideas widget. If you open that up, you're going to see that it's asking you to share your great ideas about using open-ended materials in your program. So, go ahead and take a minute. Share with your colleagues. You can respond to people's comments, and say, "Thanks for that great idea," or, "I'm going to try that this week." And what we'll do is, at the end of the episode, we'll download all of your great ideas from the widget, and we'll post it in the "Teacher Time" community on MyPeers.

So, go ahead and do that. And while you're sharing some great ideas, we're going to transition to our next strategy, which is about engaging in meaningful interactions with children. So, in addition to the really great environment, and engaging environment, that you are creating with your materials, and allowing children opportunities to explore, what we know is that you, in your position, are really important because of the interactions that you bring on a daily basis to children — indoors and outdoors — during routines and activities.

We know that you're spending time interacting with children on a regular basis. And so, there's three ways to think about this. Your interactions can be nurturing, they can be responsive, and then they can be effective. And we want to think about all three of those. The nurturing interactions are really those conversations that you have with children that support their feelings of confidence and curiosity. It builds a relationship between you and the children, and it allows them to feel safe, so they're more ... They feel safer to explore the world around them. The second one is responsive.

And responsive interactions really require you to observe children closely, and then respond to what they're interested in, and respond to their questions and ideas in a back-and-forth way that really builds on their knowledge, and builds on their curiosity. And then finally, effective interactions, which can also be nurturing and responsive, are the ones that support children's growth and development across the ELOF domains — which is really our goal for children every day.

So, we're going to think a little bit about how we can use these interactions each day to support children's scientific thinking. And Treshawn is going to start with some strategies to do that.

Treshawn: There are a few strategies you can use that will support you in being nurturing, responsive, and effective in your daily interactions with children. These include using scaffolds, helping children use the inquiry cycle, speaking science, listening, and modeling a questioning mind. First, let's talk about scaffolding.

So, scaffolding means offering just the right amount of support, and structuring the environment and your interactions, so that children can be successful. And "successful" doesn't mean children always make the correct hypothesis every time, or play with the objects the way they were intended every time. "Successful" means children were able to engage with the materials in their own way. But this does require close observation, and listening, and understanding where children are, and where they're headed next.

So, it's important to watch and listen first, to see what children are able to do first on their own. Because research shows us that, when we allow time for children to explore on their own, this really promotes their curiosity, and keeps them engaged even longer than when adults just give directions. So, for example, it's important for children to explore building with blocks on their own, but if a child begins to get frustrated because their tower keeps falling, you can step in with a suggestion, and help them be successful.

Scaffolding also includes providing supports in the environment that allow children to be successful, like asking families to share science-related words in their home language that you can use with children during your daily interactions and activities, or even providing children with visual prompts to support them in expressing their ideas and communicating with others.

Judi: That's right. Those scaffolds are so important, especially as you begin to help children moving through the inquiry cycle. Sometimes, you might have a child who has a lot of questions, or a lot of ideas, but when it comes time to explore them, or make a guess, and you run up against a barrier, or you can't solve a problem, then, they just give up.

And so, we really want to support children in making their way through the inquiry cycle to observe, and ask questions, to make guesses, to try to them out, and then, to think about what they've learned, and maybe ask some new questions. If you think about how many times in a day a preschooler asks, "Why?" You know, if we were trying to answer every "why" question, we're going to get exhausted, too. So sometimes, the best answer is, "That's a great idea. What do you think?" or, "That's an interesting question. I don't know. Let's find out."

I say this to my 5 year old all the time, and he gets frustrated sometimes. He just wants to know the answer. But if we really want to support children in thinking this way, and using the inquiry cycle, then, sometimes, throwing it back at them, and saying, "Let's find out together," is a good way to do that. If you're working with children who are dual-language learners, this might be a little bit more challenging, but you can use some strategies to work with dual-language learners so that they can engage in this inquiry cycle, as well. So, for example, you might learn a few open-ended questions in their home language.

We have a great resource for you that will support you in that. We have a new app that's called the Ready-DLL mobile app. And you can find the link to that in your green resources widget — just a way to give you some words and phrases to help you interact with children who speak different languages. And while you may not always understand their response, what they say, you can definitely observe them if they're working with materials.

You can learn a lot about what they think just by watching what they're doing. What you want to do is really make sure that we're supporting children in thinking about finding out the answers to their questions, or the solutions to their problems. You can have children work together to engage in this, so that they're supporting each other. But what you really want to do is make sure that you're giving them the space to explore, and then the time to reflect on what they learned, and maybe even ask some new questions.

Treshawn: Next, speak science, and encourage children to speak science, too. And you can do this throughout your day, inside and outside, during routines and activities. You can even use words and phrases like, "I notice," or, "I wonder." You can make comparisons, noticing a similarity and differences between objects. 'Cause the use of language really extends and enriches the scientific experience for children, and really reinforces the growth of science knowledge.

And for children who are hearing-impaired, words that describe a new concept can be taught through sign language, or even through visuals. And when you use open-ended questions, you encourage children to speak science. High-quality conversations really support all children, but especially benefit those children who are dual language learners. So, encourage children to communicate in their home language to support their curiosity and questioning. And engage families in the child's learning by asking for science words or phrases that you can use in the learning environment. And encourage families to do the same at home.

Judi: That's right. In addition to encouraging children to speak science, it's also really important for us to listen to children, and their thoughts, and ideas, and to model a questioning mind. It's important for us to remember that our goal is not to fill children's head up with science ideas or facts, like these examples that you can see here. The teachers are acting as the expert. So

instead, what you want to do is to join children in the exploration and learning that they're doing. So, for example, the other day, my son asked me how the leaves know when it's time to fall off the trees. And so, of course, my response was, "That's an interesting question. What do you think?" But then, I realized, as we were talking, and he had some very interesting ideas, that I don't actually really know how the leaves when it's time to fall off the trees. So, we explored that together. It's OK not to know all the answers.

So, rather than feeling like you have to be the expert, or give all of the answers to children, all of the information that they need, think of yourself as their co-learners. You can ask questions together. You can listen to children's ideas, and validate them, be curious, and explore the world together.

Treshawn: So, after all of that wonderful information, let's watch a video of a teacher with her preschoolers as they reflect on what they've been learning about pea pods. Pay close attention to the way she scaffolds, supports inquiry skills, speaks science, and encourages the children to communicate. And look for ways she models a questioning mind. Let's watch.

[Video begins]

Child: [Speaking Mandarin]

Teacher: And another reason we also use the home language to communicate with them is because, sometimes, English is not their first language, so it's difficult for them to express to their idea. So, using the home language to encourage them to share about their idea, then, they will have more input into the activity, or they have more input into the concept that we are learning. And using the home language will help them to understand deeper about the concept that we are trying to teach them.

Child: [Speaking Mandarin]

Teacher: That's a good question. [Inaudible] has a question. He said, "How do the ..." Today, when we were talking about comparing the both of the pea — the green one and the dry one — and one of the child, and he was sitting next to me, and he was saying — he was explaining, in Mandarin — and he was saying that, when he went to the garden, and he looked for those two peas, and then one was green inside, and then one was black inside. So, without the language, he might not be able to tell me the whole story of how he went to the garden, how he did observation on those two different kinds of peas. So, that's one of the reasons that we want to ...

[Video ends]

Treshawn: This is such a great video. We just love how this teacher is responsive to the children speaking science in their home language. It's great. So now, we're going to give you another "Teacher Time" minute to write down in box three of your viewer's guide your thoughts on the way this teacher supported scientific thinking with the children. Take a minute.

Time's up. What did you find? Well, we found a lot. So, in regards to using scaffolds, this teacher allowed the children to explain their observation. And the one particular child explained his observation in his home language, and this really helped deepen his understanding of the concept.

She also scaffolded language by translating in English for all the other children to get a better understanding. She used basic inquiry skills by repeating every question for the whole group to think about, so that maybe they could formulate their own hypothesis. And she also invited children to communicate in their home language, too. And she repeated children's questions in English to give English-speaking children the opportunity to learn from each other. What a great way to show this nurturing, responsive, and effective interactions with children during science learning.

Judi: OK. So, the last step we're going to talk about in terms of supporting science thinking is providing science experiences and learning opportunities. And for this, Gail Joseph is going to give us some strategies. Unfortunately, she couldn't be with us here live today for our episode, but she did send us a video.

So, we're going to watch Gail's video. She's going to give us some great tips for using books to support science thinking. You can use your viewer's guide, here, to write down the titles of the books you'd like to read, and maybe some of the strategies that Gail is going to share about how to use books. So first up, Gail is going to tell us about a few books that encourage children to speak science.

[Video begins]

Gail Joseph: Hey, "Teacher Time," you caught me. I'm in the "Teacher Time" lab, and I am just making some lab notes, because I know this session is all about science. And one of the ways I love to reinforce science with young children is through children's books. When I look through books, I'm looking for, what is the scientific learning that I can draw out or reinforce in this book? I also think about, what are the advanced vocabulary words related to science that I'm going to find in these books, and be able to define for young children? And then, I'm also thinking about how I might take what we're learning in the book beyond the book into extended learning for young children.

So, let's get started with a stack of great books that I think are meeting our criteria with our lab notes that you might be able to find at your public library, and use with young children, as well. This is a book I found that I am really loving. It is called "Spiky, Slimy, Smooth: What Is Texture?" Because one of the things we want to do with young children is help them use their senses to make observations, and give them lots of rich, advanced vocabulary to describe their observable phenomena.

So, this book is filled with really great adjectives and vocabulary words — "gooey" and "very oozy," things like "dry" and "paper-y." And because another aspect of scientific learning we want to reinforce for young children is being able to compare and contrast. Some are plain and smooth. Some are knobbly and warty. And some are curvy and lumpy.

Moving from a book with lots of words to a book with no words, but that still connects us to scientific learning, is this book by Tana Hoban, "Shadows and Reflections." This really helps young children use scientific practice words, such as making observations, describing what they're seeing, making predictions. So, even on the first page, what do you think this is a shadow of? How do you think reflections are formed? So, lots of great ways to inspire some of

those science practice words. Here is a great book for all of those budding biologists in our classrooms.

This one is a book, "What Do You Do with a Tail Like This?" I love this book because it starts with just a picture of things that are common to many animals – noses. So, we can ask children, "What do you think these are?" And have them observe, and then, make a guess. They are noses. But then, asking them to make a prediction. What do you think you would do with a nose like this? This one is ... It's flat. It almost looks like a shovel.

And after children have some time to make predictions with their observations, you see, "Oh, if you're a platypus, you use your nose to dig in the mud. It is just like a shovel." And then, because you'll have some children that are very interested in animals, you can move beyond ...

[Video ends]

Judi: Those are some great suggestions, and I wonder if some of you have some of those books, and have already used them in your programs. Remember, you don't have to use those exact books. What you want to use are Gail's strategies for encouraging children to speak new words, to describe things in interesting ways.

So, take a look through the books that you do have, even if it's not the exact ones that Gail has recommended, and look for books that encourage children to use interesting and new vocabulary, and to make observations and predictions. And remember, your library can be a great resource for finding books in children's home languages, especially if you have multiple languages represented in your community.

OK. So, next up from Gail, she's going to give us suggestions for books that encourage children to be scientists, and to use the scientific method, or the inquiry cycle.

[Video begins]

Gail: Alright. Another learning that we like to encourage is actually articulating the steps of the scientific method. This is one of my favorite books to do that. This is "Charlotte the Scientist Is Squished." So, Charlotte — the character here — is a bunny who is a scientist, but she has a problem. She is pretty squished because she has many brothers and sisters living in a small environment. And she's trying to think about, "How can I create some space for me to do my science?" And so, it's pretty fun, because she decides that the scientific method can help her figure this out.

So, she follows these scientific steps. Step one is to ask a question. And her question is, "How can I get some space around here?" Step two is to form a hypothesis. And she says, "If I can get rid of my brothers and sisters, I'll have room to be a real scientist." Children will love this story. And again, another way to move beyond the book is to ...

Here, it summarizes the steps of a scientific experiment. And you can encourage children to do their own experiment. Here is another great book. This "Ada Twist, the Scientist." I love this one. It's just super fun and rhythmic text. It really helps children know that part of being scientists is being imaginative, and having some persistence. It also has a little sneaky history of some real scientists in here, that I love. Here is another one that is "Cece Loves Science."

And I love that we show this young female of color being a scientist in this book. And here she is, asking questions. She has ... I love that her little old tree house, here is her laboratory. That's another fun science word to use. But this also reinforces the scientific method. She has a teacher, Ms. Curie, who tells her about scientists, and what scientists do. And then, she actually assigns the children in the class to do something scientific. And so, she goes about doing the scientific method with all of her scientific notes, here — experimenting, trying different things to feed the dog and coming to a conclusion.

And then, again, how do you move beyond the book? There is some nice little glossary, here, that describes some of Cece's scientific facts that you can encourage children to try on their own. This is actually a biography of a real scientist in a nice developmentally appropriate picture book form.

This one is, "Shark Lady: The True Story of How Eugenie Clark Became the Ocean's Most Fearless Scientist." It's about her love of sharks, and how she grows up to study sharks, and her dream is really to help save the sharks. There's lots of great vocabulary words throughout this, a nice little timeline about her becoming a scientist. And then, because you will have some budding zoologist in your classroom, there are lots of ways to talk about the ...

[Video ends]

Judi: Thanks so much to Gail for those great ideas. I hope you have some new inspiration for reading books, and using them to support scientific thinking in your programs. Now, let's take a minute just to talk about the arts. We referenced it throughout this episode, but let's think specifically about how the arts could be used to support children's exploration of science concepts. For example, the dramatic play area. What a great opportunity to think about creative ways to be scientists, or to be a veterinarian, or a paleontologist.

Dramatic play opens up the door to children's imaginations, and supports reasoning, problem-solving, and creativity. There's also a lot of science happening in the art area. Think about the ways that children engage in the inquiry cycle as maybe they mix different amounts of white paint into a solid color to create a wide range of shades.

Treshawn: What are some ways that you'd like to connect art and science in your learning environments? In box five of your viewer's guide, take a "Teacher Time" minute to write down some ideas to share with your teaching team or a supervisor. Take a minute.

Judi: Well, that was your last "Teacher Time" minute. We have come to the end of our episode. We sure covered a lot today, and let's just review. Remember the three main ways to support children in exploring science ideas. We want to encourage you as preschool teachers and family child care providers to provide engaging and accessible environments, and to make sure that your daily interactions with children are nurturing, responsive, and effective.

And then also, you want to make sure you're offering many opportunities for children to explore science ideas, indoors and outdoors, through your daily activities and routines, and through books that help children see science through many different lenses. And remember, most important of all, listen to children, and model that questioning mind for them. When you do this, you support children's development in all of the ELOF domains, and you build that

foundation for a lifetime of science exploration and learning. Thank you so much for joining us today. It's been great to be with you. Before we go, we're going to leave you with just a few resources that will support you as you engage with the little scientists that you work with each day.

Treshawn: OK. So, on the ECLKC, there are two resources that we'd like to highlight. First, the STEAM interactive PDF and the STEAM 15-minute in-service suite. Now, these resources provide a overview of the STEAM components, and share ways to engage children, birth to age 5, in STEAM concepts and materials. And also, both resources provide strategies for supporting families in getting excited about STEAM. So, how cool is that? We encourage you to take a look, when you have the time, up on ECLKC.

Next, we have MyPeers. And MyPeers is a virtual informal social community to exchange ideas, and share resources, and lend support to the early childhood community. And if you haven't joined MyPeers already, you can join via the ECLKC. And you'll find us there in the "Teacher Time" community. And we'll be posting some more videos, and sharing strategies related to supporting the little scientists in your learning environments. And you know what? There are 58 open communities on MyPeers, with over 10,000 members.

So, in addition to "Teacher Time," you might find that there are some other interesting communities to join. Check them out. We've created a handout for you in the green resource widget that can help you find some communities that are relevant, and that you may want to join. So, on our apps, and our phones, and our devices, we've got a couple of programs. The first is Text4Teachers. And this program sends you two free text messages per month with information, tips, and research, and resources to help strengthen and support your teaching practices. So cool.

And then, we have our ELOF2GO app. And so, this app helps you learn more about the ELOF. It gives you on the go access to the ELOF goals for children, and provides you with some effective teaching practices to support children's growth and development. And you don't have to carry around the ELOF book if you don't have to.

Lastly is our Ready-DLL app. And that's now available in your app store. So, if you work with children who are dual-language learners, in this app, you can access resources, learn some key words and phrases, and discover implementation strategies right from your smartphone. So, our next "Teacher Time" episode is going to be in December, and we'll be talking about exploring technology with infants and toddlers.

So, definitely plan to join us for that. But if you want to wait for the preschool episode of that, that's going to happen in January. We'll be talking about exploring technology with preschoolers. So, remember to download any helpful resources from the green resource widget, and thank you so much for joining. It's been great having you here. Take us home, Judi.

Judi: Thanks. Treshawn, and thanks again, everyone, for being with us today. It's been a lot of fun. Please remember to fill out the evaluation. We do look at your feedback, and we take it very seriously. We love to hear from you, and think about ways that we can improve what we do here at "Teacher Time." And do consider joining us, if you haven't already, in the MyPeers "Teacher Time" community. We'd love to hear from you more about what you do to support

science thinking and STEAM thinking in the programs where you're working. So, we'll see you next time. We're going to talk about technology. And we hope to see you then. Thanks, everyone.