Office of Head Start

Early Childhood Science

National Webcast Series

Discovering Science

Webcast #1:

Building the Foundation from Science in the Early Years

Science Webcast

SLIDE 1:

Discovering Science

AMANDA BRYANS: Welcome to Discovering Science—the Office of Head Start's four-part series on building the foundation for science in the early years.

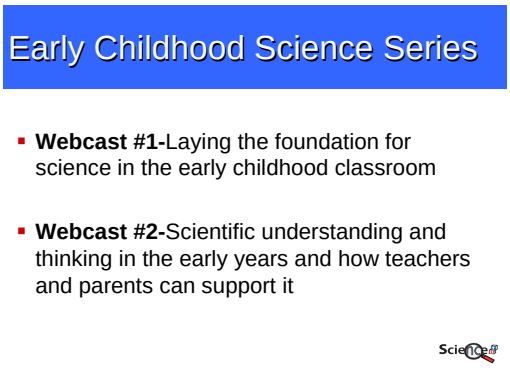
UP CG:

Amanda Bryans

Director, Educational Development and Partnerships Division, OHS

My name is Amanda Bryans, and I'm the Director of the Educational Development and Partnerships Division at the Office of Head Start. Thank you for joining us today.

Today's Webcast, *Let's Do Science: An Introduction to the Why and How of Science During the Early Year*, is the beginning of a dynamic series that will explore what science looks like from birth-to-five.

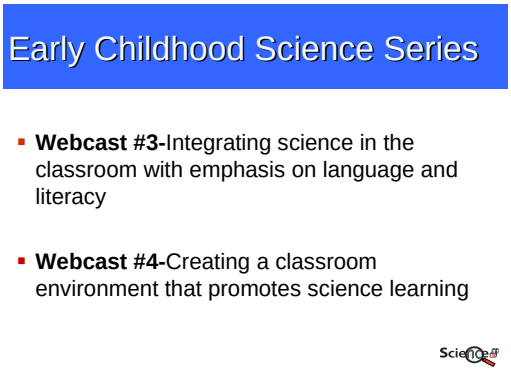


Slide 2

The first Webcast will focus on laying the foundation for science in the early childhood classroom.

In the second Webcast we will discuss scientific understanding and thinking in the early years and how teachers and parents can support it.

The third Webcast will reveal various ways for teachers and parents to integrate information about science across the early childhood curriculum with an emphasis on language and literacy.



Slide 3

And the final Webcast will specifically focus on creating environments that promote science learning.

There are many reasons why we chose to dedicate a series of Webcasts to explore how science works in the early years. First, children are born motivated to explore, question, seek, and

discover their world. We see this as our chance—our golden opportunity—to build on their natural disposition to question the way the world works and why.

The other reason is equally as practical as the first. Science is important in the early childhood classroom so that the business of "doing science" becomes a natural and critical part of children's early learning. And just like math, we're simply not teaching science enough. In today's world where modern technology hides the way things work, children need many opportunities to experience science firsthand.

I'd like to share a quick story. I have always known that young children are inclined to be curious, but as the mother of a 3 year-old, I have the pleasure of watching my daughter make new and interesting discoveries every day.

Recently I bought her a jar of bubbles. When I took the wand out of the jar and blew, her bright eyes widened to reveal her amazement. But when the bubbles burst, her tiny face was overcome by dismay and mixed with a hint of devilish curiosity. Her defiant expression seemed to say, "I'm going to find out what happened to that bubble!?" Immediately she snatched the bottle and began digging the wand deep inside.

For us, this was a science moment, and moments like these occur throughout the preschool day.

I saw this as my chance to ask, "Where did the bubble go?" and "Why did the bubble burst?" She didn't know. She was completely puzzled. So we repeated the process, blowing and bursting, blowing and bursting, yielding the same result. In the end my daughter concluded, "The bubble is all gone."

She was right. We blew so many bubbles that we emptied the jar!

Our hope is that by the end of this series teachers will renew their commitment to the process of learning by rediscovering your inner child again. Ask questions. Explore. Discover. Repeat.

To help us better understand the world of early childhood science, we invited Dr. Shari Ellis, a Senior Early Childhood Advisor for the Office of Head Start, and Project Director for the Center for Informal Science Education at the Florida Museum of Natural History, to host this Science Webcast series. And to share the classroom perspective, Dr. Ellis will be joined by Barbara Dowling, a Head Start teacher in South Dakota and a 2008-2009 Fellow at the Office of Head Start.

Science is fun, and we want to get teachers excited and engaged, which in turn will engage young children in the science that happens around them all day every day.

Now, let's do science!

UP CG:

Shari Ellis, Ph.D.

Senior Advisor, Early Childhood, Office of Head Start

SHARI ELLIS: Thank you, Amanda. I am very honored to lead you in this engaging discussion about science. I hope you find the information we provide practical, useful, and inspiring in your everyday teaching endeavors.

In addition to the content Amanda mentioned earlier, today's discussion will feature video clips from leading experts from around the country on early childhood science, and a segment we would like to highlight called "Voices from the Field." "Voices from the Field" brings to you the stories of real teachers, Head Start Directors, and Education Managers. We value the insight and experience those working in the field have to offer. They will share their observations, challenges, and triumphs as they evaluate what it takes to teach science in a preschool classroom.

Later on in the Webcast, we want to hear from you. During the final segment of each of the Webcasts, we will take your questions during our live Question and Answer session

Throughout the Webcast you can simply type your question into the "Ask a Question" form on the browser. We strongly encourage you to write in.

You can also download a copy of this Webcast's viewer's guide by clicking "Viewer's Guide" located at the lower portion of the screen. After each Webcast, we will provide a list of resources for further review. We also will e-mail you a survey to invite your feedback on this series and suggestions for it and others.

POST:

ECLKC: www.eclkc.ohs.acf.hhs.gov

And if you'd like to watch the Webcast again, or you want to refer a friend, this series will also be made available on the Early Childhood Learning and Knowledge Center, also known as the E-C-L-K-C Web site.

Now on to science! When you think about science in the early childhood setting, what comes to mind? Do you think of a well-stocked science center? Is it a classroom festooned with paper plate fish? Perhaps you think of the volcano experiment made with vinegar and baking soda? Or is it a parade of classic science experiences—sprouting lima beans, mixing colors, exploring sound canisters? What is science in the early childhood classroom and how does "doing science" work?

Barbara Dowling joins me today to help answer a few of those questions. Barbara, will you please share some of your thoughts about science in the early childhood classroom.

UP CG:

Barbara Dowling

2008-2009 National Head Start Fellow, Office of Head Start

BARBARA DOWLING: Thank you, Shari. Science in the early childhood classroom is not about having all the answers or understanding complex scientific knowledge.

Slide 4:

It's about engaging with children on a shared journey of discovery.

Slide 5:

It is about taking risks and learning along side the children.

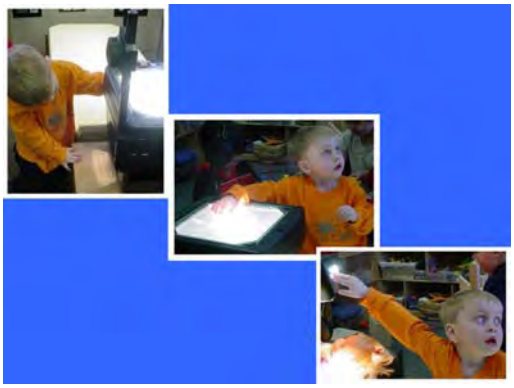
Slide 6:

It is about experiencing ah-ha moments in tandem with the children.

Science in Head Start is about observing with children; watching them create predictions, hypotheses, guesses at what might happen.

Slide 7:

How much water can I put in the container before it will spill?

Slide8: 

Where does the light come from? How does it make the picture on the wall? If I put my hand up here will it make a shadow on the wall?

Slide 9:

Science is about taking advantage of the learning environments in your Head Start program, your neighborhood and your community.

Slides 10:

What does nature offer us?

Slide 11:

What does it have to offer that encourages exploration, investigation and discovery?

Slide 12:

Each area we live in provides different answers to that question. Some of the most engaging opportunities are right outside the classroom door.

Slides 13-15:

Science can be the worm that the children find on the sidewalk that comes into the classroom and grows into an investigation.

Slide 16:

Science can be about wondering where the water goes after it enters the drain.

Slide 17:

What might live in the hole and why? Do different animals live in different holes?

Slide 18:

Are the tulips really under the snow?

Questions upon questions, observations upon observations, hypotheses upon hypotheses, investigations upon investigations happening every day with your children. Are you open to the opportunities the children present to you? Can you as a teacher notice these opportunities and the interests of the children, create learning environments that support and guide these interests and join in the explorations and discoveries?

Slides 19-20:

As a teacher I have learned science requires being flexible and open to change.
It's about finding out the chrysalis formed by the caterpillars found on the dill weed would not go through metamorphosis in 21 days but needed to sit over winter before the butterfly emerges.

Slide 21:

Science is also going on a discovery walk to see the rock wall with many interesting rocks and never getting there because we found a garter snake on the way which held the children's interest.

Slide 22:

It is about the story of Tad our Head Start tadpole who came to us in March. The children were excited to think about it changing it into a frog. The first thing we observed: Tad was not tiny and black like the ones we had seen before in the pond. Tad was big and green.

We waited and waited for Tad to grow legs. Two weeks came and went. Then four weeks came and went. And five weeks came….and went. Tad continued to swim in his bowl.

Summer came and Tad went home with Emily.

Slide 23:

August came and Tad came back to school.

Fall passed. Winter came, then in February we thought we could see tiny little nubs that might become legs. The children were so excited! Finally in March, Tad grew hind legs.

Slide 24:

He even got a new home so he could get out of the water when his front legs appeared which would surely be soon. And again we waited and waited for Tad's front legs to appear. Summer came again and he went home with Elizabeth. In July, not in five weeks but 16 months after he arrived in Head Start, Tad finally had front legs and in a matter of days his tail disappeared.

Slides 25:

He is now happily in his new home living the life of a bull frog. This experience gave us many opportunities to research, to think, to make predictions. It was exciting for the children and for me, the teacher. The process of scientific learning did not mean that I as the teacher had to have all the answers. The children and I found them together.

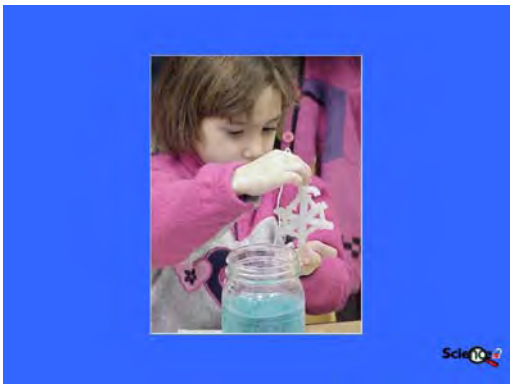
For me, this is the joy of science as an early childhood teacher.

Slides 26:

Letting the children own the discovery and sharing in the “Ahha” moments.

Slides 27:

Being curious, thinking and challenging the children to think.

Slide 28: 

Encouraging the children and myself to engage in reflection, asking the questions such as

Slide 29:

What?... So what?...

Slides 30:

Now what?

The scientific thinking we instill in the children will make a difference in their lives, allowing them to not only understand concepts but also to think about them. Challenging their thinking—that's what makes inventions.

Slides 31:

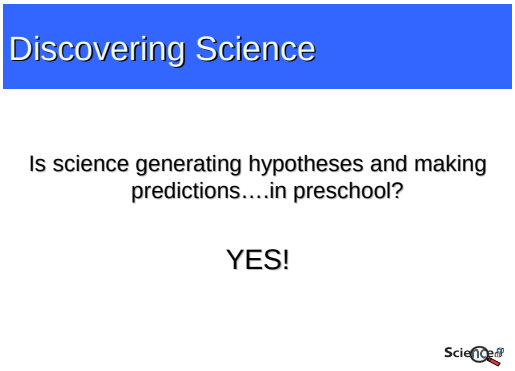
At the end of your busy days as you reflect on what you observed in your classroom, ask yourself, “What happened in my classroom today that amazed me?” and “What do I wonder about?” It makes being an early childhood teacher an incredible experience everyday.

UP CG:

Shari Ellis, Ph.D.

Senior Advisor, Early Childhood, Office of Head Start

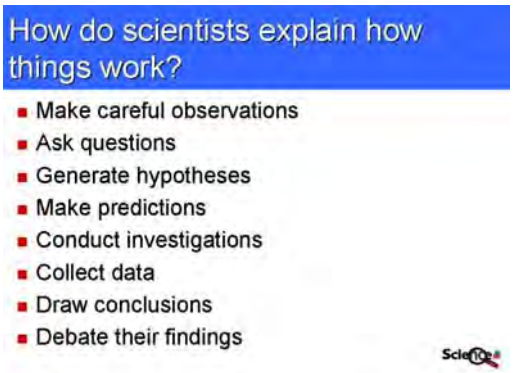
Slide 32:



SHARI ELLIS: Thank you Barbara! After hearing Barbara’s stories, some of you may be thinking, “Science is generating hypotheses and making predictions….in preschool?” The answer is “Yes.”

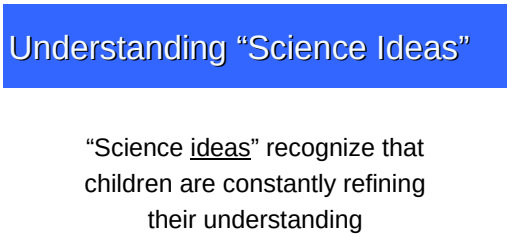
In this Webcast series, we are going to explain how teachers can create opportunities for children to not only build knowledge about the world, but to practice the thinking skills that are at the

heart of scientific inquiry.



Slide 33:

The goal of science is to understand the world around us. Scientists want to explain *how* things work. To achieve that goal, they **make careful observations, ask questions, generate hypotheses, make predictions, conduct investigations, collect data, draw conclusions, and debate their findings** with others—though not necessarily in that order. As scientists engage in these practices they create the knowledge that we call "theories," "laws," and "facts." So science is both a body of knowledge and the enterprise that creates that knowledge.



SLIDE 34:

However, instead of knowledge, I'd prefer to talk about "science ideas." The term knowledge implies mastery. It suggests one either has a concept down or does not. But we know that children's understanding is constantly evolving as their cognitive capabilities change and with exposure to new experiences. By using the term "science ideas" we recognize that children are constantly refining their understanding.

So what about infants? Infants begin working on science ideas in the first months of life.

Slide 35:

One science idea that infants work on is that objects and living things like people and animals continue to exist even when they are out of sight.

Other science ideas that emerge early have to do with the physical characteristics of objects.

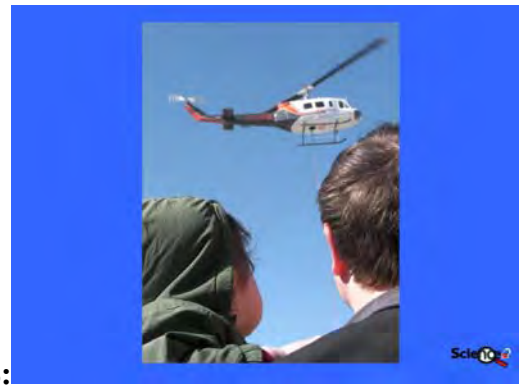
Slide 36:

Infants begin to learn about texture as soon as they put things in their mouths-which begins even before birth!

Infants also begin to build categories very early on.

Slide 37:

They can distinguish between things that can move on their own and those that cannot. And by the end of the first year, babies group objects into an impressive array of categories such as food, birds, animals that don't fly, and vehicles.

Slide 38: 

During the early years, children build on these early science ideas and add new ones. They begin to make finer distinction among objects. They can distinguish between objects found in nature and those made by people. They can separate what an object is, from what it does, from what it is made of. They also come to understand how their own actions can cause objects to behave in different ways.

Children also work on ideas related to biology. They can begin to grasp the function and location of various body parts such as the heart, lungs, and blood. Some preschoolers also know a good deal about health and illness. Though their understanding is incomplete, many preschoolers

know the difference between illness and injury, and have a sophisticated understanding of contamination, germs, symptoms, and contagion.

Some young children also think about plants. Children who are given hands-on experiences with plants learn that they grow, heal, decompose, and die. And the potential of young children to become experts on animals which interest them is legendary. They can understand that different animals eat different things, that they require different kinds of habitats, and that some undergo amazing transformations over the course of the life cycle. Some of these ideas are reflected in the Head Start Outcomes Framework. Barbara would you like to share a few with us?

BARBARA DOWLING: The key indicators suggesting a child is acquiring scientific knowledge are listed under the Science Domain.

A few indicators that tell you when a child is gaining the basis on which they can build scientific knowledge include when the child can:

- Expand knowledge of and ability to observe, discuss, and describe the natural world and materials;

Roll VTR!

Hula Hoop

TRT:

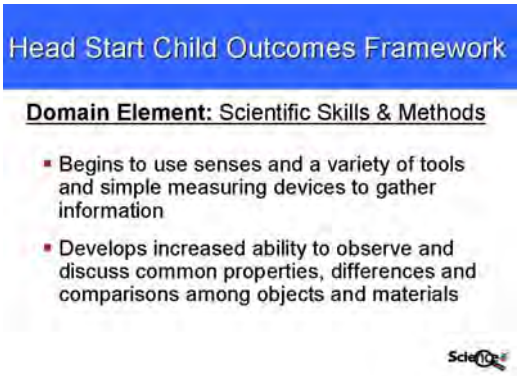
- Expand knowledge of and respect for their body and environment; and

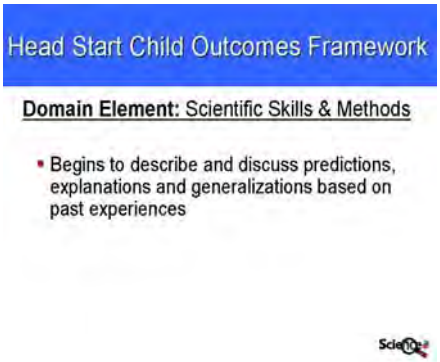
- Show increased awareness and beginning understanding of changes in materials and cause-effect relationship.

– END VTR –

As you can see, some of us are still working on our understanding of cause and effect.

The second aspect of science is the process of creating knowledge. This aspect of science is addressed in two domains in the Head Start Outcomes Framework. In the Science Domain, it is referred to as Scientific Skills and Methods.

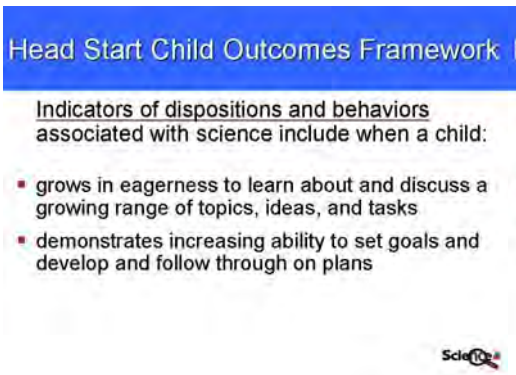


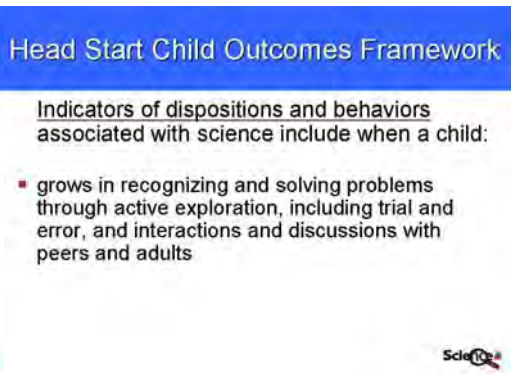


Slides 39-40:

Some of the indicators are when a child:

- Begins to use senses and a variety of tools and simple measuring devices to gather information;
- Develops increased ability to observe and discuss common properties, differences and comparisons among objects and materials; and
- Begins to describe and discuss predictions, explanations and generalizations based on past experiences.





Slides 41-42:

The dispositions and behaviors that we associate with science are also reflected in Approaches to Learning.

Some of the indicators are when a child:

- Grows in eagerness to learn about and discuss a growing range of topics, ideas and tasks
- Demonstrates increasing ability to set goals and develop and follow through on plans
- Grows in recognizing and solving problems through active exploration, including trial and error, and interactions and discussions with peers and adults.

Roll VTR!

Feather/Playground/Water Table

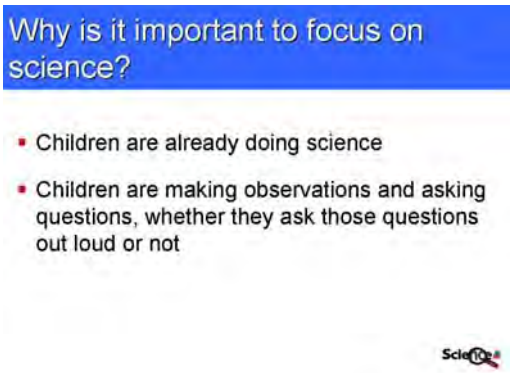
TRT:

SHARI ELLIS: Even before infants can reach for objects or produce language, they are using the five senses to learn about the world.

As infants accumulate experience, they begin to develop expectations. These expectations-or hypotheses-allow infants to make predictions. They predict that a caregivers' face will return in a game of peek-a-boo and that a ball will bounce. As children's language, cognitive, social-emotional, and motor skills develop, they become capable of engaging in more complex and systematic exploration. Children say things and ask questions that can lead to actual investigations. They gradually grow able to think about ideas and to draw conclusions on the basis of evidence. As self-regulatory skills increase, children can collaborate with peers. And as motor skills improve, they can begin to represent their thinking with drawings and incorporate tools such as magnifying lenses into their explorations. Children, however, need support and guidance from adults in order to learn how to use these skills in the context of discovery.

Given the emphasis placed on science process skills and scientific inquiry in the Head Start Domains and Indicators, it is somewhat surprising how little inquiry and guided exploration actually takes place in our classrooms. However, the state of science in Early Head Start and

Head Start classrooms is probably quite similar to that found in most early childhood settings nationwide. Doing science well has not been a priority in most early childhood programs.



Slide 43:

So, why is it important to focus on science in early childhood? Well as Amanda already mentioned, one reason is that children are already doing science. They are making observations and asking questions—whether they ask those questions out loud or not. Sid the Science Kid, A new PBS science program aimed at preschoolers, is built on the questions common in early childhood. Let's hear what some of those questions might be—

Roll Tape!

Sid the Science Kid: Show intro and Mushy Banana

TRT: 1:26

Ok! Are we all re-energized?

Clearly, young children will work on science ideas even without our support and encouragement. Why would we not want to support and encourage science in the early childhood classroom? We offer support for children in every other domain! We provide tools and toys and structured experiences to support the development of fine and gross motor skills. We help children attach words to feelings to foster social-emotional development. We give children access to a wide variety of art supplies to nurture their creativity.

We do all these things because we recognize the importance of intentionally creating an environment that will promote skills and understandings that we as an educated community value.

I recently asked Karen Worth, an expert in early childhood science education, her thoughts on the value of science in early childhood:

ROLL TAPE!

Karen Worth VTR

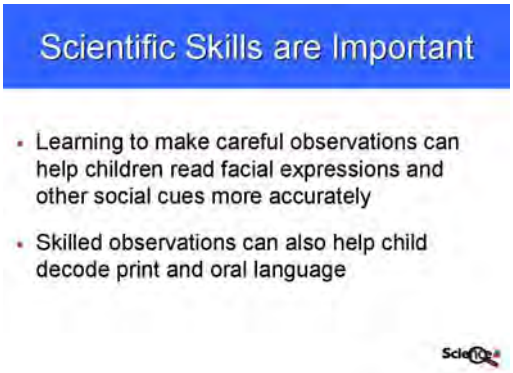
TRT: 2:12

Scientific thinking skills are used in many situations outside of science.

Slide 44:

The ability to observe carefully can help children read facial expressions and other social cues more accurately.

Slide 45:



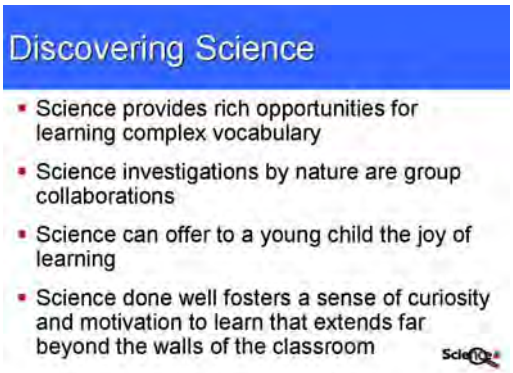
Skilled observation can also help children decode print and oral language.

Slides 46-47:

The ability to make predictions based on past experience is similarly relevant in many non-science situations. Again, being able to predict how people are likely to respond to specific behaviors is part of being social skilled. The ability to predict what is going to happen next is essential to understanding books and other media.

Slide 48:

One of the most critical, but also the most complex thinking skills, is the ability to reflect on why one thinks the way one does…to reason on the basis of evidence. Even as adults, we often reason "from the gut" rather than think critically about why we believe what we do. By participating in guided discovery, young children can begin to develop these sophisticated reasoning skills.

Slide 49: 

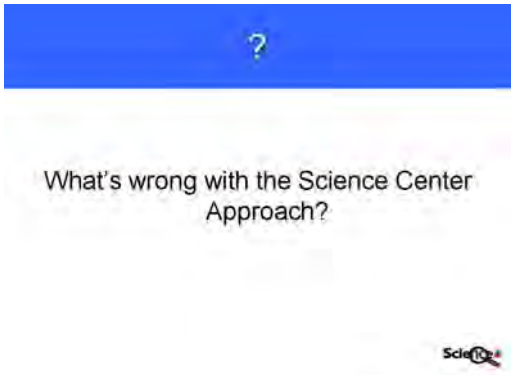
Science provides rich opportunities for learning complex vocabulary. Science words are often long and technical and children love to say them! Science topics often require conversation about things that are not in the immediate here and now. They require children to speculate "what if?" to predict the future, or to imagine a past world.

Science investigations by nature are group collaborations. Children learn to work together to find answers to questions, to persevere in the face of challenges, to counter one another's reasoning, and to share in joint discovery.

But perhaps the greatest contribution science can offer to a young child is the joy of learning. Science done well fosters a sense of curiosity and motivation to learn that extends far beyond the walls of the classroom.

Before we explore more fully what good early childhood science looks like, let's examine some common examples of early childhood science that falls short. By providing names for these approaches, we are hoping that you will be better able to identify them in the classroom and work towards improvement.

One of these approaches to early childhood science may be called the "Science Center Approach." This approach is based on the idea that if there is a science or discovery area, science is happening in the classroom.



Slide 50:

What is wrong with this approach? I'm going to pause a moment and ask you to think of at least one reason why science centers alone are not enough to support children's science learning.

Our observations of science centers reveal that they are often uninteresting. The items displayed may not attract children's attention, or there may be so many materials available that the choices are overwhelming. We have also found that often teachers assume that children will somehow discover how to use the science tools all on their own.

As a consequence, magnifying tools may be used to stir up the math manipulatives, while magnets are enjoyed for their sensory properties alone. While well-designed science centers can

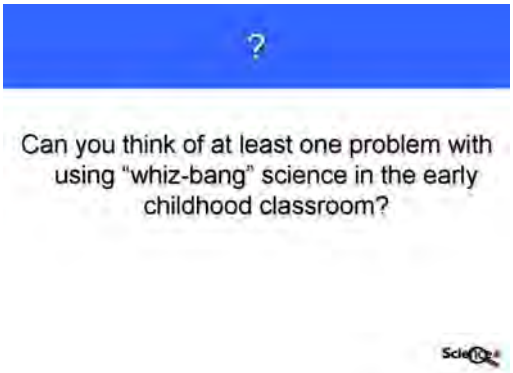
supplement other science experiences, centers alone do not reach our standards for good early childhood science.

Another approach to early childhood science is “science as arts or crafts.”

As the title suggests, in this approach, teachers substitute art or craft activities for actual science exploration. Examples would be making any kind of animal out of paper plates, gluing puffy balls on paper to represent caterpillars, and asking children to tell creative stories about what they would do if they had a pet dinosaur. These activities are not inherently bad. They do not, however, constitute science. Also, in the defense of teachers, internet searches for preschool science produces more craft, music, and dramatic play activities than actual hands-on science. I recently purchased a book that promised educational activities on animal habitats. It turned out to be primarily a book of crafts. In our third Webcast, we will address ways teachers can adapt standard creative art activities to better support science learning.

Another approach to early childhood science that frequently falls short might be described as “whiz-bang” science.

Teachers who rely on “whiz-bang” science tend to believe that science has to be really exciting in order to engage children’s interest! Examples of “whiz-bang” science include making a volcano out of vinegar and baking soda, “growing” a sponge dinosaur from a small pellet to huge proportions in a bowl of water, and watching pepper dance across the surface of milk when a drop of soap is added.



Slide 51:

Can you think of at least one problem with using "whiz-bang" science in the early childhood classroom?

Let me offer perspective on some common problems you may have identified. While the demonstrations are often compelling, they typically must be performed by adults-which means that children are not offered the hands-on experiences we know best support children's science learning. The science behind the demonstrations is usually complex and beyond the ability of young children to grasp. Whiz bang demonstrations may create lasting memories…and perhaps even inspire a future scientist here and there. But they do not support the development of science understanding. The fact that demonstrations tend to be "one-shot" deals that are not integrated within a larger unit of study exacerbates this problem. We recognize that teachers will sometimes do whiz bang science because they are fun. But it is possible to create the same level of excitement with a large block of ice in the water table, building ramps in the block area, and running colored water through a maze of clear tubing.

But it is possible to create the same level of excitement with a large block of ice in the water table, building ramps in the block area, and running colored water through a maze of clear tubing.

There is yet another approach to early childhood science often found in our classrooms. Let's call it the "hodge-podge approach." Sometimes, whiz-bang science is incorporated in this model.

In hodge-podge science, teachers offer children a variety of science-related experiences over the course of a week or month.

Shari Debrief with Examples

TRT:

Lesson plan with different science experiences on M, W, F

The hodge-podge approach will successfully allow teachers to successfully complete a lesson plan but does little to foster children's conceptual development. Early childhood science is most effective when children have the opportunity to explore a topic deeply and over time. Moving quickly from one topic to another, one concept to another, is not the best way to support children's learning.

Ann Crowell is a Head Start Director in North Central Florida. Ann has observed science being done poorly in early childhood classrooms. This deeply concerned Ann because, as a child, she loved nature, but her interest in science went unnoticed by the adults in her life. In this video clip, she reflects on why science may be short-changed in our classrooms and what the costs might be.

ROLL TAPE!

Crowell VTR

TRT:

Now that we have outlined some of the less effective approaches to science that we have observed in early childhood classrooms, let's address what excellent early childhood science would look like. A good place to start would be to reflect on Barbara Dowling's earlier

description of science in her classroom. Some of the words and phrases that stand out in Barbara's comments are "discovery," "joy," "curiosity." Barbara, I might note, is not just a Head Start Fellow, but also a former South Dakota Teacher of the Year. She places a premium on careful observation of her children, following their interests, taking risks, and savoring the journey of discovery alongside children.

Dr. Lilian Katz is a Professor Emeritus at the University of Illinois at Champaign Urbana. Recently I sat down to talk with her about early childhood science. This is what she had to say.

ROLL TAPE!

Lillian Katz VTR

TRT:

BARBARA DOWLING: The story Dr. Katz shared in her interview is a great example of science in the classroom, which is something that can be studied deeply and over time.

Why can it be difficult to change teachers' approaches to science in the classroom? Before we try to change how teachers approach science, it is helpful to reflect on the reasons why science in early childhood settings so often is nearly absent or limited to the science area or occasional explorations of leaves, color mixing, and magnets. Why don't we see in-depth explorations such as the investigations of balls that Dr.Katz described earlier?

One possible explanation is fear. Many teachers admit that they are afraid of or uncomfortable with science, but what exactly does that mean? Some of us literally feel sick when science is raised because of bad experiences we had in school, while others' minds just turn to mush while their eyes glaze over. Other teachers are curious about some domains of science, but are deeply afraid of creepy-crawlies.

And yet other teachers are interested in science, but fear they will not be able to do science well in a classroom setting. They may be afraid that they will make mistakes—that they will be

unable to pronounce terms or answer children's questions correctly and that they will look foolish. They are the teacher after all, so aren't they supposed to know the answers?

Some teachers may be anxious because they do not know which science topics are appropriate for young children, or how best to support children's learning in science. They wonder: are my expectations too high? Are they too low? Am I confusing the children?

Others may worry that they lack the necessary materials to support conversations or investigations about science.

And some maybe have considerable experience doing science in their own lives, perhaps with their own children, but be mystified with how to translate that knowledge into a classroom setting.

Other teachers may be afraid to tackle science explorations because of concerns about how supervisors or parents will react. What if they tackle a science project and it is a total bust? What if they encourage attitudes that conflict with messages that children are learning at home? What if they spend an entire morning observing ants and have nothing to show for it when parents arrive to take their children home?

Over the course of the next three Webcasts, we will be addressing these issues in more detail. For the time being, however, I would like to emphasize one major point.

Efforts to change how science looks in any given classroom need to be individualized to the needs and concerns of the teachers in that classroom. Many teachers may have fears, but they do not necessarily share the same fears.

That being said, one common obstacle to providing good foundational science experiences for young children is that teachers' conceptions of models of science are simply not accurate. Understandably, many teachers base what they do with science in the classroom on how they learned science in school. This usually means an emphasis on acquiring a body of knowledge

such as vocabulary or facts. Experts in the field of education debate whether this model of science learning is appropriate for older children. But we can say with certainty that this model of science is not appropriate for young children. Rather, the focus of science during the early years is exploration. The emphasis is not on acquiring facts, but in nurturing a curiosity about the world and the motivation and skills used to learn more about it.

Moving teachers away from science as learning facts, to science as learning about the world through exploration, are effective in changing teachers' comfort and interest in science. Let's listen to some comments by Head Start education managers and teachers participating in a project in partnership with the Florida Museum of Natural History and Head Start in North Central Florida.

Roll Tape!

Voices from the Field, 1

TRT:

Clearly, it is possible to build teacher confidence in science. But let's not underestimate the challenges of changing actual classroom practice. I think it is worth noting that changing teacher instructional behavior is not easy. Teachers in Early Head Start, Head Start, and the early childhood field are not the only education professionals faced with this problem. Numerous studies from the pre-K to college years and across all academic domains document the difficulty in changing the way teachers approach instruction. And keep in mind that the kinds of changes we are advocating are not small or subtle. We are not simply suggesting a set of activities that can be readily inserted into any classroom curriculum. For many teachers, what we are asking them to do is fundamentally change the way they think about science. To make those changes, it will take time and plenty of support and encouragement. We are confident, however, that our teachers can rise to the challenge. And, as a result, we will see exciting changes in our classrooms.

Roll Tape!

Voices from the Field, 2

TRT:

SHARI ELLIS: Let's now lay out some basic principles that are going to guide our efforts in this series.

Slide 52:

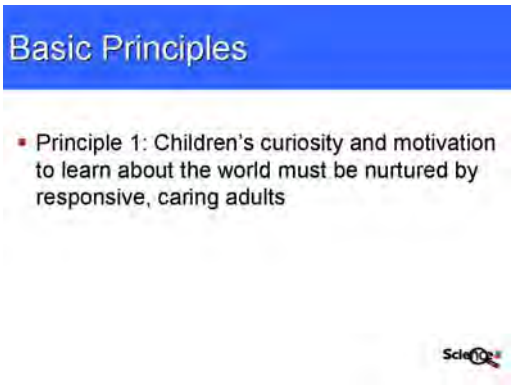
It has become popular, in recent years, to refer to children—even newborns—as "natural scientists."

Slide 53:

You may have read magazine articles or seen television shows documenting the surprising cognitive abilities of even the youngest infants.

It is true that children are biologically prepared to learn about the world around them, just as they

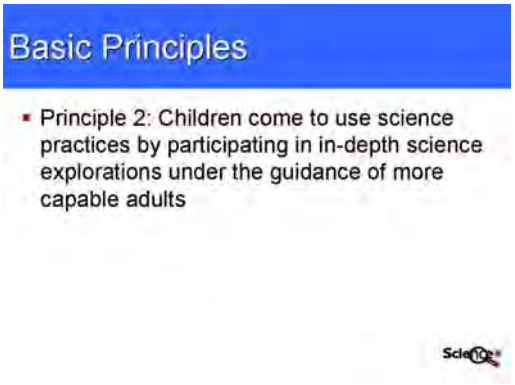
are biologically prepared to learn to walk and talk and interact with other people. That said, we should not conclude that because children are born motivated to learn about the world, that their motivation will remain strong without nurturing from responsive caregivers.



Slide 54:

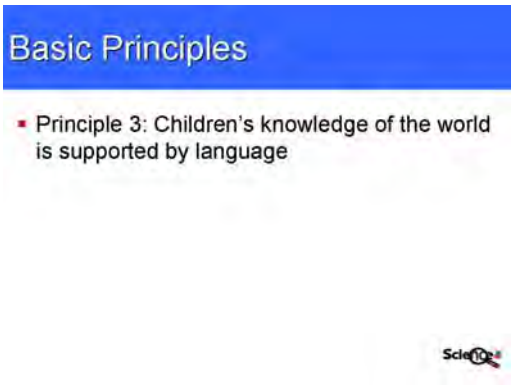
From the time children are born they try to make sense of their world. They are curious about their world. They seek to engage with adults, and persist in activities that result in actions by objects or caregivers. Curiosity, seeking, persistence, wondering, figuring out, and predicting are all dispositions of learning that need to be nurtured by the adults in a child's environment. These dispositions are important for the development of scientific thinking and will be discussed more in the subsequent Webcasts.

Now let's examine the claim that children are already scientists. If children are born scientists, some may conclude that we have to do little beyond providing young children a rich environment and the opportunity to explore. In fact, children's explorations typically do not resemble that of actual scientists. Their explorations can be short-lived, unsystematic, and end abruptly when efforts are blocked or attention is drawn elsewhere. It is important to remember that scientists use a special set of intellectual tools to understand how the world works. Children are not born with that set of tools. Rather they come to use the set of practices we associate with science by participating in science experiences under the guidance of more expert adults.



Slide 55:

These thoughts are supported by our second principle: *Children come to use science practices by participating in in-depth science explorations under the guidance of more capable adults.*



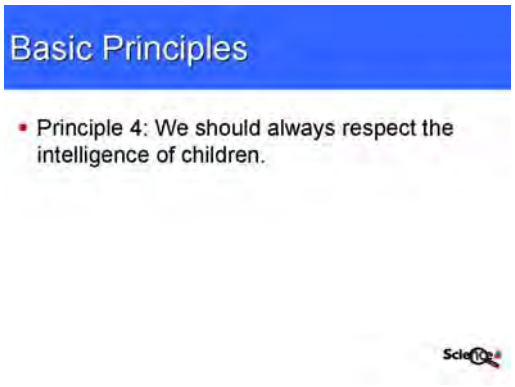
Slide 56:

Our third principle focuses on the development of children's knowledge and understanding via language. Research shows that children develop much more accurate understanding when they talk about their experiences with adults.

We also recognize that children's understanding or explanations of the world can be a charming mix of reality-based insight and fantasy. Given that our ultimate goal is to foster an accurate grasp of the world and how it works, how do we respond to children's confusions and misconceptions? Are we quick to laugh? Or to say-no, that's wrong. Where did you get that crazy idea?

As teachers who work with young children, we need to have an image of a competent, capable child with an infinite wealth of potential. We need to believe in their ability to wonder and

investigate and the possibilities that can be. When we hold this image of the child, our work with children becomes exciting for us and for the children, and we as teachers develop our “scientific thinking” alongside them.

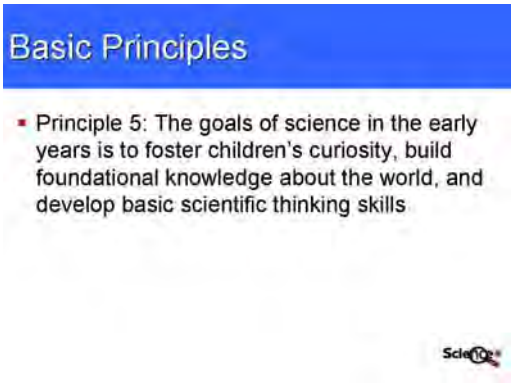


Slide 57:

This brings up our next principle: *We should always respect the intelligence of children.*

Our last principle addresses what we think science is during the early years. Experts debate whether anything children do during the early childhood years can be considered science. Some have coined other terms such as “scienc-ing” to describe what happens in the early years in an effort to bridge the gap between beginning science exploration and the formal discipline of science.

Our view is that what we are doing in the early years is building a foundation for science. Learning to observe carefully, generate questions, and explain one’s thinking are just a few of the foundational skills required for science. Our final principle is:



Slide 58:

The goals of science in the early years are to foster children's curiosity, build foundational knowledge about the world, and develop basic scientific thinking skills.

Now, let's conclude our Webcast today by listening to what Andi Lybrand, a former Head Start teacher and curriculum specialist has to say.

Roll TAPE!

Andi Lybrand VTR

TRT:

Now we're going to take a short break now and when we come back we're going to turn things over to our audience for our live Q&A session.

We'll see you in 3 minutes…

*****3-MINUTE BREAK***Slides59-61:**

SHARI ELLIS: Welcome back! Now it's time to answer your questions and here to help Barbara and me in doing so is Jean Simpson from the Office of Head Start.

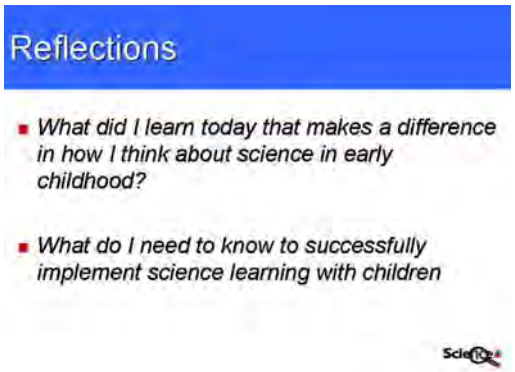
We want to hear from you so please submit your questions to the e-mail address indicated on your screen.

JEAN SIMPSON**:** Thank you, Shari and Barbara. It's not too late to send your question in. Remember you can type your question into the "Ask a Question" form on the browser.

Our first question is from….

And our final question is from…

JEAN SIMPSON (ON CUE: Thank you Shari and Barbara, and thanks to all of you for your thoughtful inquiries. As we leave you today we would like to offer you two questions to reflect on:



Slide 62:

What did I learn today that makes a difference in how I think about science in early childhood environments?

AND What do I need to know to successfully implement science learning with children?

This concludes our first Science Webcast. In our next Webcast we will talk about the development of science understanding and skills from birth-to-five.

In the meantime, please visit the Head Start E-C-L-K-C for additional information concerning science, and please feel free to send any success stories or suggestions you have about these Webcasts to the email address at the bottom of your screen.

UP CG:

ScienceWebcasts@esi-dc.com

Once again, thank you again for taking the time to be with us today; and for the precious hours you give in making a difference in the lives of the children and families we serve in Head Start and Early Head Start daily.

See you April 2nd for the next Webcast.

Play Credit Roll