This guide walks you through the presentation **Science Success: What and Why?** These notes include information about the PowerPoint slides and examples of language to use.

SLIDE 1:
SCIENCE SUCCESS: WHAT AND WHY?

What to know: This presentation introduces meaningful science activities for young children and discusses the importance of science in the preschool years.

SLIDE 2:
WHAT IS SCIENCE?

What to say: Plants? Wind? Water? Cooking? Yes! It's all science.

SLIDE 3:
HAPPENING ALL THE TIME

What to know: The figure on the left is Buzz Aldrin on the moon, Apollo 11, July 20, 1969. NASA photograph. Public domain. http://www.nasa.gov/multimedia/guidelines/

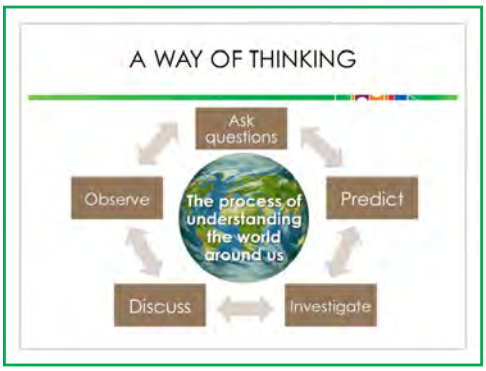
What to say: Science is not just a list of facts based on past discoveries, such as the world is round instead of flat or men first stepped on the moon in 1969. It is a way of thinking that will lead people to discoveries *today and tomorrow*, especially since technology is just in its infancy. Children who engage in science today are learning to participate in scientific inquiry and to become citizens of an increasingly complex world.

SLIDE 4:
VIDEO: MORE "SENSE MAKING" THAN WE THOUGHT

What to know: The video shows an interview with Dr. Megan Bang, assistant professor of education at the University of Washington, who says, "Children can do far more extraordinary things than we typically give them credit for." Bang is part of a project to improve science learning and school achievement for Native American children.

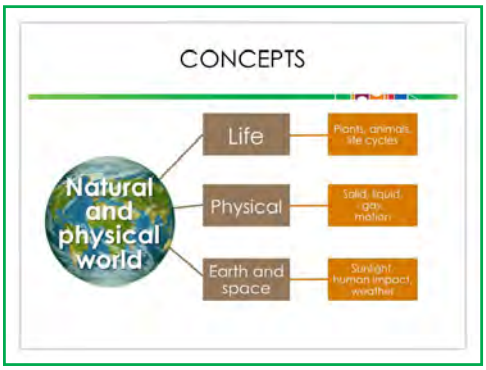
Reference: Menominee Science Project. (2010). *Living in Relations Research Project*. Retrieved November 22, 2013 from http://menomineescienceproject.webs.com

What to say: Science learning in early childhood is not a "pushing down" of academic subjects from elementary school. Children naturally engage in exploring the world around them. We now know that young children are capable of learning complex topics with effective scaffolding from adults.



SLIDE 5:
A WAY OF THINKING

What to say: Science is the process of learning about the world around us. We—adults and children—do that naturally by observing, asking questions, predicting, investigating, and discussing. This is the scientific method. Adults and children do these steps in many different orders.

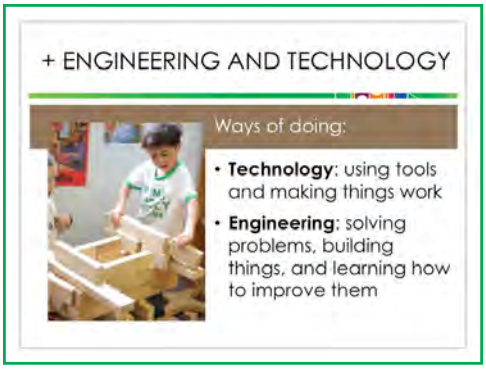


SLIDE 6:
CONCEPTS

What to know:

Reference: Achieve, Inc. (2011). *Next Generation Science Standards*. Retrieved November 18, 2013 from http://www.nextgenscience.org

What to say: In addition to learning science skills, children need to learn concepts and begin to understand relationships in the natural and physical world. The middle column in this graph shows main science areas. To the right are key science topics for preschoolers, based on a sampling of state early learning standards and the Next Generation Science Standards.

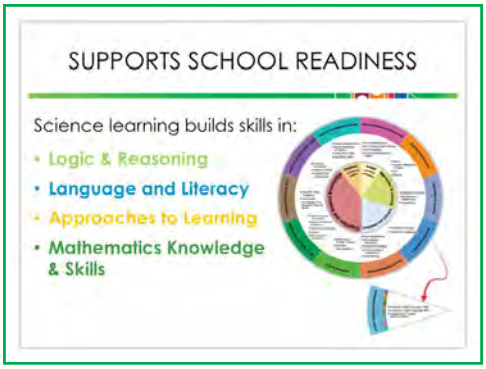


SLIDE 7:
ENGINEERING AND TECHNOLOGY

What to know:

Reference: Boston Children's Museum (n.d.) *Sprouts science, technology, engineering & math teaching guide*. Retrieved from http://www.bostonchildrensmuseum.org/sites/default/files/pdfs/STEMGuide.pdf

What to say: While science is a "way of thinking," engineering and technology can be thought of as "ways of doing."



SLIDE 8:
SUPPORTS SCHOOL READINESS

What to know:

Reference: Bryans, Amanda (host). (2009). Science Webcast Series. Science webcast #1: *Let's do science! An introduction to the why and how of science during the early years.* [Webcast.] Washington D.C: Office of Head Start. Retrieved from http://eclkc.ohs.acf.hhs.gov/hslc/tta-system/teaching/eecd/Domains%20of%20Child%20Development/Science/sci-webcast-1.htm

What to say: Science skills are important for children's readiness in many domains.

Science supports skills in the domain of Logic & Reasoning by encouraging children to:

- See cause and effect.
- Compare objects.
- Engage in symbolic representation with drawings, models, and movement.

It promotes Language Development and Literacy Knowledge & Skills when children:

- Learn complex vocabulary.
- Have opportunities for conversation.
- Practice close observation, a necessary skill for reading.

It encourages gains in Approaches to Learning because children:

- Have opportunities to show creativity and inventiveness.
- Work together with peers.
- Engage with interesting and hands-on activities, which is particularly important for some children with special needs and dual-language learners.
- Persist and wait when experiments last several days.

Science strengthens Mathematics Knowledge & Skills with opportunities for children to:

- Measure.
- Count results.
- Graph outcomes.

All these add up to improved school readiness.

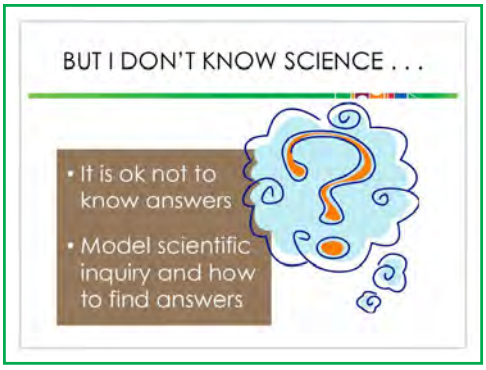
What examples of science activities have you seen in classrooms that encourage children's progress in other domains?

SLIDE 9:
SUPPORTS LATER SCHOOL SUCCESS

What to know: Children's understanding of physical and social science facts when they enter kindergarten is the strongest predictor of later reading and science scores. Combined with early math skills, general knowledge about the external world is an indicator of later math achievement. Attention and motor skills also predict later science achievement but even more strongly predict later math success. Early observation skills and understanding of the physical and social world appear to be as important as math and reading for kindergarten readiness.

Reference: Grissmer, G., Grimm, K. J., Aiyer, S.M., Murrah, W. M., & Steele, J. S. (n.d.) *New school readiness indicators.* Charlottesville, VA: The Center for Advanced Study of Teaching and Learning (CASTL) at the University of Virginia. http://curry.virginia.edu/uploads/resourceLibrary/Research_Brief-Readiness_Indicators.pdf

What to say: Young children's science knowledge also predicts later success in reading, science, and math.



SLIDE 10:
BUT I DON'T KNOW SCIENCE

What to say: We know that many preschool teachers don't feel comfortable teaching science in their classrooms. You can be a model for children by demonstrating how to use resources to find information.

SLIDE 11:
VIDEO: GET INTO THE POOL

What to say: Dr. Daryl Greenfield, a professor of psychology and pediatrics at the University of Miami, has been involved in research about young children's school readiness in the area of science. He has worked with the Miami Dade County Head Start Program to improve children's science readiness as they transition to elementary school. He offers words of encouragement for early childhood teachers approaching science activities.

SLIDE 12:
SCIENCE = FUN

What to know:

Reference: Feynman, R.P. & Leighton, R. (1985). *Surely you're joking, Mr. Feynman (Adventures of a curious character)*. New York: W.W. Norton.

What to say: Finally, science is fun and can engage children and adults in the process of learning. Here is a quote from Richard Feynman, the American physicist, who won a Nobel Prize in 1965.

SLIDE 13:

Provide participants with NCQTL contact information and encourage them to visit our website for additional resources: http://eclkc.ohs.acf.hhs.gov/hslc/tta-system/teaching/center

This document was prepared under Grant #90HC0002 for the U.S. Department of Health and Human Services, Administration for Children and Families, Office of Head Start, by the National Center on Quality Teaching and Learning.

SPRING 2015