



This guide walks you through the presentation **Science Success: How?** These notes include information about the PowerPoint slides and possible language to use with them.



SLIDE 1: SCIENCE SUCCESS: HOW?

What to know: This presentation addresses effective practices for early childhood teachers in guiding preschool science learning.



SLIDE 2: FROM BIRTH

What to say: We know that children, starting from infancy, become deeply engaged in what is going on around them and are interested in how they can affect their environment. Adults can follow children's interests and support them—what we call *scaffolding*—so children learn more than they would have on their own. This is the beginning of scientific inquiry.



SLIDE 3: VIDEO: INFANTS EXPLORING

What to know: An adult shows two infants how to press buttons to pop up parts on a toy. Then she describes the infants' actions as she helps them push the buttons.



SLIDE 4: BY PRESCHOOL YEARS

What to say: Toddlers explore their world without effort or thinking, examining cause and effect and spatial relationships. At age 3, children show an increased ability to ask questions about the world around them and to describe objects and events in their environment in more detail. By age 4, they begin to understand that there are multiple ways of thinking and that they can revise their thinking about how the world works.



SLIDE 5: VIDEO: GRAVITY

What to know: After reading a book about space and gravity, a teacher asks children to predict whether a book will float or fall when she lets go of it. After they watch it fall, one of the children asks a question about what will happen if they blow on the book while it is falling. They try the experiment, and the book still falls.



SCIENCE LEARNING



Model and teach the scientific method:

- Question
- Observe
- Predict
- Experiment
- Discuss

SLIDE 6: SCIENCE LEARNING

What to say: Young children can learn more from their investigations with adult help. Teachers can model and teach the steps of the scientific method. The scientific method is a way to conduct science inquiry, ask questions, and search for answers. People do these steps every day, not necessarily in this order.

Optional learning activity:

Participants could do this or another science activity before they review the next slide.

- Prepare a poster board with these headings: Questions, Observations, Predictions, Experiments, and Discussion.
- Provide participants with straws. Give small groups items that they might be able to move by blowing through straws. Some examples are: small squares of tissue paper, cotton balls, ping pong balls, and foil pieces.
- Introduce the activity by telling participants that they will have a chance to explore materials in a way similar to the way children might play with them.
- After about five minutes, ask for volunteers to share questions they had as they explored the materials. Record those under the Questions heading. Examples of questions are: “Can I move the foil by blowing through the straw?” and “Which thing will be easiest to move?”
- Ask participants to describe their experiences in the other categories. In the Discussion section, participants may share conclusions, questions they would like to investigate further, or concepts they learned about, such as motion or air.
- Note the many science skills that can come from such an investigation. Adults can help children identify these skills and use science vocabulary.

HELP CHILDREN OBSERVE



- Explore open-ended materials
- Use five senses and tools
- Record observations

SLIDE 7: HELP CHILDREN OBSERVE

What to say: One way to teach children science skills is to practice them individually. Teachers can show children how to observe closely, using all *five senses*. This is a key skill and may be broken down into opportunities to practice observing with each sense and to use more detailed vocabulary. Children can look at the characteristics or properties of things and compare and contrast objects. They can also record their observations in ways such as drawing, making charts, or writing.



ASK QUESTIONS

Know	Wonder	Learn
<ul style="list-style-type: none">What are turtles?What do they eat?Where do they live?How do they move?How do they breathe?How do they see?How do they hear?How do they smell?How do they taste?How do they feel?How do they think?How do they feel?How do they think?How do they feel?How do they think?	<ul style="list-style-type: none">What are turtles?What do they eat?Where do they live?How do they move?How do they breathe?How do they see?How do they hear?How do they smell?How do they taste?How do they feel?How do they think?How do they feel?How do they think?How do they feel?How do they think?How do they feel?How do they think?	<ul style="list-style-type: none">What are turtles?What do they eat?Where do they live?How do they move?How do they breathe?How do they see?How do they hear?How do they smell?How do they taste?How do they feel?How do they think?How do they feel?How do they think?How do they feel?How do they think?How do they feel?How do they think?

- Model open-ended questions
- Encourage children's questions
- Write them down

SLIDE 8: ASK QUESTIONS

What to say: In the chart on the slide, a teacher recorded children's questions about turtles in the middle column. Teachers can model asking open-ended questions and create an environment that encourages children to ask questions. They can help children identify when they have asked a question. Teachers can also help children record questions, which makes children's thinking visible to them.

PREDICT

Food	Prediction
Apple	Yes
Banana	Yes
Carrot	Yes
Orange	Yes
Pepper	No
Spinach	No
Tomato	No
Yogurt	No

- Model "testable" predictions
- Ask children for their predictions
- Ask children why they think that
- Use the word "prediction"

SLIDE 9: PREDICT

What to say: When children make predictions, it is important to ask children *why* they think what they do. For example, if a child thinks that an object floats because it is small, ask him or her to test this prediction with other small objects, such as a pebble or a piece of bark. When the child sees the results, the experience promotes learning more than hearing the answer from the teacher. This approach also encourages the child's own motivation to investigate.

Let children know that scientists often have to keep making new predictions and testing them until they find accurate answers.

EXPERIMENT



Provide opportunities to:

- Test theories
- Make conclusions
- Study something deeply

SLIDE 10: EXPERIMENT

What to say: As much as possible, encourage children to do experiments. Provide hands-on opportunities. Ideally, choose experiments that are testable and measurable. Children can use tools, technology, and their senses when investigating.

RECORD RESULTS



- Measure
- Write in journals
- Draw observations
- Make graphs and charts

SLIDE 11: RECORD RESULTS

What to say: Encourage children to record their observations and measurements just as scientists do. That way they can look back at findings to analyze and discuss results.

DISCUSS



- What did you find out?
- Why did that happen?
- What else do you want to know?

SLIDE 12: DISCUSS

What to say: Children often give incorrect reasons for their findings. Support more inquiry by helping children ask more questions that inspire investigation.

GETTING STARTED

- A rich environment
- Hands-on activities
- Small groups
- A mix of inquiry and concepts
- Teacher scaffolding



SLIDE 13: GET STARTED

What to know: To encourage participants' involvement, you might ask them to share the types of science materials and activities they have in the classroom.

What to say: This slide lists basic elements for meaningful science experiences.



DO SCIENCE ALL DAY

Events of day	Ideas for science activities
Reading books	Nonfiction or fiction books about nature
Mealtime	Discussions about the weather and where food comes from, tasting new food
Center time	Growing and recording plant growth, ramps in the block area
Transitions	Games like "I Spy" or movement activities: "Let's walk like an elephant!"
Outdoors	Shadows, nature walks, water table

SLIDE 14: DO SCIENCE ALL DAY

What to know: This could be an opportunity to ask participants for their ideas about promoting science skills and concepts in young children's daily activities.

What to say: Science can be a planned activity. But since it is also a way of thinking, it should be done throughout the day.

A WORD ABOUT *THE* SCIENCE AREA

- Rotate items
- Have children contribute
- Use the materials in activities



SLIDE 15: A WORD ABOUT *THE* SCIENCE AREA

What to know: Teachers can show how to use objects in the science area, such as the balance scale and hand lenses, and ask children to bring in interesting items from nature.

What to say: Some teachers can support science learning without paying a lot of attention to the science area. Others use that area a lot. Science areas should be dynamic, with open-ended materials. Change things in the area. Items don't need to be expensive. They can include objects found in nature, such as rocks and leaves.

USE SCIENTIFIC VOCABULARY



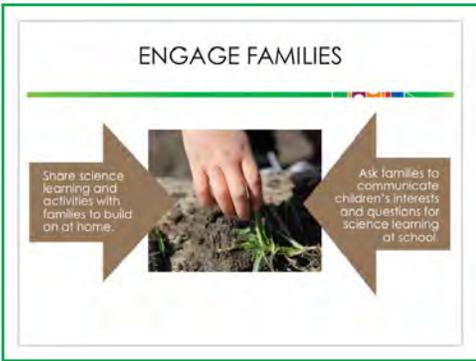
- Tools: *ruler, thermometer, journals, scale*
- Key words: *planet, liquid, seed*
- Process of scientific inquiry: *predict, observe*

SLIDE 16: USE SCIENTIFIC VOCABULARY

What to know: Strong language skills help science learning. Clear language shows precise thinking. Students must describe observations and scientific ideas clearly. Discussing and debating ideas is essential to learning science.

What to say: This slide shows areas where teachers can introduce vocabulary. Teach children to use the vocabulary of scientific inquiry plus new vocabulary related to content.





SLIDE 17: ENGAGE FAMILIES

What to say: Research shows that family conversations and suggestions for related activities at home can increase children's science interest and knowledge. Family members may also enjoy participating in investigations at school.



SLIDE 18:

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>