



Science

How Do Young Children Experience and Understand the Physical World?

Preschool children are full of questions and naturally curious as they begin to develop their own theories and ideas about the way the world works through play and exploration using all their senses. “The National Science Teachers Association (NSTA) affirms that learning science and engineering practices in the early years can foster children’s curiosity and enjoyment in exploring the world around them and lay the foundation for a progression of science learning in K–12 settings and throughout their entire lives” (NSTA, 2014). Early care and education providers can promote children’s scientific thinking by nurturing their curiosity and creating a dynamic learning environment that embraces observation, inquiry, investigation, and experimentation, even if it is messy and noisy!

Science

Inquiry: curiosity; exploration; investigation; focused observations; asks questions; makes predictions; and makes comparisons

Symbolic Thought: exploration; pretend play; identifies and uses symbols to represent thinking and ideas; develops ability to reason; explores cause and effect; makes inferences and generalizations; explanations; uses scientific tools; and develops theories and ideas

Sciences: physical science; life science; earth and space science; and environmental science



Tools and Resources

[NAEYC:10 Tips to Support Children’s Science Learning](#)

[First Discoverers: Why Science Education is Important to Early Childhood](#)

[National Geographic: Teaching Science During the Early Childhood Years](#)

[National Science Teaching Association: Early Childhood Science Education](#)

[Education.com: Preschool Science: Learning at the Playground!](#)

[The Edvocate: The Benefits of Learning Science in Early Childhood](#)

Examples of Integrated Learning

How children may exhibit these skills	How early care and education providers can encourage these skills
<p>Build a racetrack and ramp during free play. Observe speed and distance while racing and rolling vehicles down the ramp, then invite friends to experiment.</p>	<ul style="list-style-type: none"> ▪ Capitalize on naturally occurring events during play to inspire inquiry, experimentation, investigation and emphasize child-initiated, authentic, first-hand experience and exploration rather than science taught by the teacher. ▪ Offer a variety of purposeful materials and scientific tools for exploration and manipulation. For example, sensory table with sand and measuring cups for scooping and pouring; light table and flashlight with opaque materials; natural materials and magnifying glass; simple machines; objects that come apart; and living organisms such as plants, caterpillars, or ant farm. ▪ Model asking open-ended guiding questions to promote investigative reasoning, deductive thinking, and inquiry. <i>Example:</i> “What do you notice?” “What might happen if...?” Encourage children to make predictions, explore alternatives and test hypothesis.
<p>Stomp in puddles and pretend to fly a kite using ribbon during outdoor play. Notice changes in weather and seasons.</p>	<ul style="list-style-type: none"> ▪ Encourage children to use all their senses in exploring the weather and changing seasons, such as the sound of thunder, feel of snow on hands, wind pushing against objects or body, temperature changes, etc. Promote outdoor play in all seasons and all kinds of weather. ▪ Model and describe making observations of objects or events using explicit vocabulary. Create graphs and charts together and discuss observations using scientific language. ▪ Model and encourage a sense of wonder about nature, the world and science. Celebrate curiosity by exploring fiction and nonfiction books with high-quality illustrations, photographs, and vocabulary to promote stewardship, environmental consciousness and thinking about our world.
<p>Notice birds in nest and at bird feeder during outdoor play. Read nonfiction books about birds independently in classroom library. Create a bird feeder in the makerspace with a variety of materials, such as cardboard, scissors, tape, feathers, sticks, etc.</p>	<ul style="list-style-type: none"> ▪ Observe children’s interests and listen to children’s questions to guide course of study for project-based learning experiences. ▪ Create a classroom that maintains a warm, accepting, and nurturing atmosphere where all questions are important, and investigation and exploration are valued. ▪ Invite children to document and discuss their explorations through drawing, sketching, painting, sculpting, writing, etc. Provide learning experiences in many modalities and learning styles and encourage children to share their ideas with peers and families.

Books to Promote Scientific Inquiry

Physical Science

ABCs of Science by Chris Ferrie
Cece Loves Science by Kimberly Derting
Dreaming Up: A Celebration of Building
 by Chrissy Hale
*Engineering the ABC's: How Engineers Shape
 Our World* by Patty O'Brien Novak
I Fall Down by Vicki Cobb
If I Built a Car and If I Built a House
 by Chris Van Dussen
Monkey With a Tool Belt by Chris Monroe
S is for Scientist by Larry Verstraete
Scientist, Scientist, Who Do You See?
 by Larry Verstraete
The Carpenter by Bruna Barros
Violet the Pilot by Steve Breen

Life Science

A Seed Grows by Antoinette Portis
A Tiny Seed by Eric Carle
Bumble Bees by Fran Howard
Daylight Starlight Wildlife by Wendell Minor
Dogs and Their Puppies by Linda Tagliaferro
Every Autumn Comes the Bear by Jim Arnosky
In the Small, Small Pond by Denise Flemming
Living Things and Nonliving Things
 by Kevin Kurtz
Mama Dug a Little Den by Jennifer Ward
Over and Under the Pond by Kate Messner
Raccoon on his Own by Jim Arnosky
The Very Busy Spider by Eric Carle
The Very Hungry Caterpillar by Eric Carle

Earth and Space Science

A Tree for All Seasons by Robin Bernard
Astronaut Training by Aneta Cruz
Dirt: The Scoop on Soil by Natalie Rosinsky
Flashlight by Lizzie Boyd
Gravity by Jason Chin
Hiking Day by Anne Rockwell
Penguanaut by Marcie Colleen
Roaring Rockets by Tony Mitton
Sky Color by Peter H. Reynolds
The Earth and I by Frank Ash
The Hike by Alison Farrell
The Snowy Day by Ezra Jack Keats
Water is Water by Miranda Paul

Environmental Science

10 Things I Can Do to Help My World
 by Melanie Walsh
A Cool Drink of Water by Barbara Kerley
Compost Stew: An A-to-Z Recipe for the Earth
 by Mary McKenna Siddals
Green by Laura Vaccaro Seeger
Here We Are: Notes for Living on Planet Earth
 by Oliver Jeffers
Hey, Water by Antoinette Portis
My Friend Earth by Patricia MacLachlan
Thank You Earth: A Love Letter to Our Planet
 by April Pulley Sayre
We Planted a Tree by Diane Muldrow
Zonia's Rainforest by Juana Martinez-Neal