

Early Care & Education Insider

Hands-On Science for Young Children *By Tanya Eggers*

Do you know a child who is not completely full of questions? As educators and parents, it's easy to tune out the barrage of inquiries—but wait—could we be missing valuable teaching moments full of motivated learners? The resounding answer is, YES! What may be a never-ending supply of trivial questions may, in fact, be a complex science investigation. "Teachers can stimulate curiosity by asking questions themselves, and by responding with warmth and enthusiasm to children's inquiries" (Trawick-Smith, p. 205). Those who work with young children have the unique opportunity to facilitate powerful learning experiences and inspire deeper investigations that will validate and empower children to learn. Hands-on science activities and investigations are essential components of any early childhood setting, and they help lay the foundation for life-long learning and healthy development.

Research

Before educators can embark on designing an effective hands-on science program for young children, it's important to know a bit about how a child's brain works. The brain is a pattern-seeking machine, and science is the quest to recognize and classify naturally occurring patterns. Jensen, author of *Teaching with the Brain in Mind*, says, "Using the pattern-detecting and pattern-making areas of the brain is critical to proper development" (p. 96).

Children are naturally equipped to learn through observation and investigations. Every experience, every word, every toy deeply impacts her understanding of her world and the connections she makes. Every time a child learns something new, the brain rewires itself based on the child's understanding. Every time the child repeats a task or a skill that particular neural pathway is reinforced and strengthened. "Learning changes the brain because it can rewire itself with each new stimulation, experience, and behavior" (Jensen, p. 13). Providing varied and multiple opportunities for a child to use what she has just learned are important ways to help build efficient connections in the brain. It may be as simple as providing blocks to drop and knock over once you've noticed that the child is dropping a cup from the highchair. The more a neural pathway in a child's brain is used, the stronger it becomes; conversely, if it is not used, the pathway can be lost.

In early childhood it is equally important that science activities be hands-on, child-driven, authentic, and active. Developmentally, young children learn and understand best from what they can see, touch, feel, and manipulate. Providing safe, readily available materials that children can experiment with is one of the most important steps towards effective hands-on science investigations.

Effective educators use a child's own natural curiosity and questions to fuel science investigations. Another way to explore science concepts is with informational books and stories infused with science concepts like weather, water, animals, etc. Science activities and investigations are also a great way to build oral vocabulary, develop reading readiness, and fuel literacy development.

Basic Science Concepts and Application

Science is not just a set of facts that have already been discovered by others; it is a process – a way of thinking and understanding the world. It is observing, predicting what might happen, testing those predictions, and making sense of observations. "Children acquire scientific knowledge by 'construction' not by instruction (Kamii & Lee-Katz, 1983). They must create an explanation of observed phenomena or the outcomes of the experiments internally—an explanation that holds personal meaning" (Trawick-Smith, p. 203). As children are exploring the scientific process, teachers can pose open-ended questions that may spark more questions or a new direction to explore. "Good quality education encourages the exploration of alternative thinking, multiple answers, and creative insights" (Jensen, p. 16). Allowing and encouraging young children to explore the scientific process—rather than only using direct instruction that emphasizes science facts and prescriptive experiments—will promote the development of thinking skills such as organizing and classifying, problem solving, reasoning, and logic. Here is one way to explore the scientific method with young children in a fun and effective way.

Grow a Garden

There are many different ways to grow a garden no matter where you are located. Here are a few ideas to give children hands-on experiences and opportunities to use the scientific method. To begin, find either a garden plot or provide containers such as:

- Wooden box
- Half a wood barrel
- Plastic tub
- Single pots, terra cotta or plastic

Scientific Process

Observing—Children can observe the growing cycle from seeds, to plant, to flower, and to seeds again. They can also observe plant parts and explore the similarities and differences between plants such as colors, shapes, relative size, and textures. Children can also observe the effects of environmental elements such as water, light, temperature, and much more.

Predicting—Teachers should ask children open-ended questions that do not require a single right answer to promote guessing and prediction. Encourage children to guess which plants will come up first and which will grow to be the tallest.

Experimenting—Promote child-driven investigations based on the children's own questions by providing various materials—seeds, soils, pots, lighting, and water situations, etc.—to be used in their own experiments. Teachers can record children's observations and questions generated by their experiments. They can also provide paper, journals, pencils, and crayons for the children to record their own observations as their experiments progress. Encourage children to use drawings and inventive spelling.

Interpreting—Children learn best from their own interpretations rather than from their teachers telling them what the facts are. Therefore, teachers should continue to promote open-ended

questions encouraging children to process and draw conclusions about what they have seen in their experiments. This process will lead to more questions and to further experiments.

There are many other science activities that foster the development of the basic understanding of science concepts. Here are a few to get you started:

- Adopt a nearby pond
- Put up a bird feeder.
- Make a classroom aquarium or terrarium, or have a class animal, reptile, or bird.
- Study ants, tadpoles, or butterflies
- Cook together to explore measurement and cause and effect.
- Explore water play: what floats, what doesn't.
- Explore the five senses (touch—texture, tastes—sweet/sour, sounds—high/low tones, volume, etc., smells—identify onion, orange, banana, etc., and sight—notice visual differences)

Conclusion

When children learn by doing and experimenting they retain what they learn in a uniquely accessible way. Scientific exploration promotes the development of problem solving skills, recognition of cause and effect, and organizing and classifying. These explorations lay the foundation for future understanding of more complex science concepts later. The ability to solve everyday problems through trial and error is essential for science and self-confidence. So go ahead, have fun, get your hands dirty, and inspire a young child to explore, question, and investigate. Empowering a young child to be a generator of knowledge is a special gift that will help lay the foundation for a life-long love of learning.

Earlychildhood News: www.earlychildhoodnews.com

References and Resources

Bowden, M. (1989). *Nature for the very young: A handbook of indoor & outdoor activities*. New York, NY: John Wiley & Sons.

Department of Education brochure for parents: <http://www.ed.go/pub/parents/Science>.

Jensen, E. (1998). *Teaching with the brain in mind*. Alexandria, VA: ASCD.

Ross, M. (1995). *Sandbox scientist: Real science for little kids*. Chicago Review Press.

Trawick-Smith, J. (1994). *Interactions in the classroom: Facilitating play in the early years*. MacMillan Publishing Co.

Are you a Registered Vendor providing childcare to children receiving DSS subsidy?

Are you interested in getting your state license?
Would you like to have monthly visits from an Early Care and Education Specialist?
Find out how the ECE staff can assist you in taking this step and learn about start-up grants.
Funding may also be available to help with the cost of licensing.

Contact Kathy Edwards, Director of Early Care and Education, at The Community Partnership.
Call (573)368-2849 or toll-free (888)541-4636 or visit our website at www.thecommunitypartnership.org

Missouri Child Care Resource & Referral Network Training Opportunities

www.moccrn.com

The Terrific Twos—This workshop focuses on the unique challenges and delights of caring for toddlers in groups. Some of the topics to be covered are: what to expect from 2-year-olds, planning the day, age-appropriate activities, and effective strategies for guiding 2-year-olds.

Date: **Thursday, September 2, 2010**

Time: 6:00—8:00 PM

Number of clock hours: 2

Trainer: Sarah Traub, Human Development & Family Studies Specialist

Costs: \$5.00 per person

Location: **Pulaski County Courthouse**

301 Historic 66 E, Waynesville, MO

For more information or to register: Please call University of Missouri Extension at 573-774-6177

Date: **Tuesday, September 14, 2010**

Time: 6:00—8:00 PM

Number of clock hours: 2

Trainer: Sarah Traub, Human Development & Family Studies Specialist

Cost: \$5 per person

Location: **Phelps County Courthouse**

200 N. Main Street, Rolla, MO

For more information or to register: Please call Phelps County Extension office at 573-458-6260

Art Appreciation 101 for Young Children —This workshop is divided into three areas: What is Art? Talking with children about Art, and Appreciating other's Artwork.

Date: **Thursday, September 23, 2010**

Time: 6:00—8:00 PM

Number of clock hours: 2

Trainer: Sarah Traub, Human Development & Family Studies Specialist

Costs: \$5.00 per person

Location: **Pulaski County Courthouse**, 301 Historic 66 E, Waynesville, MO

Visit the website listed above for additional training opportunities, including those listed below.

Infant/Toddler Child Care Orientation Training— *Six Clock Hours* — Discover why babies cry. Learn why toddlers bite. Develop strategies for working with parents who don't do things the way you do. Find out about the "third" teacher of infants and toddlers. Discover the role your own personality plays in your relationships with infants and toddlers. Learn how to create spaces that maximize children's intellectual, physical, and social/emotional growth.

School-Age Child Care Orientation Training—*Six Clock Hours*— Discover the many jobs of a school-age provider. Learn what changes to expect in school-age children. Develop strategies for sharing space. Determine your own stage of professionalism. Learn tips for creating a balanced schedule.

Basic CCOT: Recognizing Child Abuse and Neglect — *Three Clock Hours* — Discover why children's bodies are so vulnerable to injury as a result of child abuse and neglect. Learn how to tell the difference between an accident and abuse. Find out what to do if you suspect abuse or neglect and how to protect yourself from allegations of abuse.

Basic CCOT: Health, Environmental Safety, and Sanitation and Developmentally Appropriate Practices — *Six Clock Hours* — Health, Environmental Safety, and Sanitation: Develop dozens of strategies to keep children safe and healthy. Hear true child care horror stories. Learn how to keep a field trip from becoming a provider's worst nightmare. Discover the basics of preparing for practically any emergency. Developmentally Appropriate Practices: Discover what young children can and can't do. Learn the ABCs of behavior. Discover the power of positive language. Develop multiple strategies for guiding behavior. Discover why play is a child's job.

The Community Partnership
1101 Hauck Drive
Rolla MO 65401

Phone: 573-368-2849
Fax: 573-368-3911

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Come visit us on the Web!

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Visit The Community Partnership's website and click on "Our Programs." The drop down box offers all of the Partnership's programs, including Early Care & Education and Educare. Discover what each program has to offer, find links to local resources, and visit the Trainings & Meetings link for a list of our upcoming meetings, training opportunities, and clock hours.

EDUCARE SUPPORT GROUP: Come enjoy networking time with other childcare providers who also understand that working with young children each day can be rewarding and challenging. We will discuss resources available to area childcare providers and you will be given the chance to share your ideas. Please join us for this opportunity.

EDUCATIONAL OPPORTUNITIES: For additional information regarding each educational event, please refer to the enclosed inserts (some are two sided) or visit us at: www.thecommunitypartnership.org. All Educare Support Groups and Educational Opportunities will be held in the board room at the following address, unless otherwise stated on event flyer:

EDUCATIONAL EVENT(S)	DATE	TIME	CLOCKHOURS
CPR Certification or CPR Renewal and First Aid — Registration & payment is required before date of training.	Saturday, October 9	8:00 am to 4:00 pm	Yes
Subsidy Orientation Trainings — Pre-registration is required.	September—Call for schedule Wednesday, October 6 Wednesday, November 17	9:00 to Noon	0
Educare Support Group Meetings	Monday, September 20 Thursday, October 21 Tuesday, November 16	6:00-9:00 pm	0
Hands-On Science for Young Children	Monday, September 20	6:30—8:30 pm	2
Child Development for Preschoolers	Thursday, October 21	6:30—8:30 pm	2
Effects of Meth on Children	Tuesday, November 16	6:30—8:30 pm	2

THE COMMUNITY PARTNERSHIP
1101 HAUCK DRIVE
ROLLA MO 65401
573-368-2849