Exploring Science with Young Children

Helping parents and family members understand their important roles can play an essential part in providing children with rich, exciting, and lasting science learning by Peter Rillero, Ph.D.

You do not need to be an Einstein to value and use science. Most of us grew up believing that science is an organized collection of facts. However, science is better defined as a way of observing and thinking about the world and communicating these thoughts to others. Experience and research show that young children get excited about science when they are given a chance to explore it. To give children a firm foundation in science, encourage them to think about and interact with the world around them. Concrete experiences that require using the senses, such as planting a seed and watching it germinate, provide a strong framework for abstract thinking later in life.

Many skills that help children succeed in science also serve them in everyday life. Observing, inferring, measuring, communicating, classifying, predicting, controlling variables, interpreting data, and developing models are important science skills recently identified by the National Science Teachers Association. These skills are not only essential for careers in science but are important for almost any career, as well as getting by in daily life.

When Should Science Instruction Begin?
The best time to introduce children to science is when they become curious about the world around them. From their first moments of consciousness, children are on a passionate quest to understand their world. Placing interesting mobiles over an infant's crib helps focus attention, spurring the development of observational skills. As children mature, they naturally become more curious about their environment and begin to interact with their surroundings. From simply touching things with their hands, feet, or mouth, they progress to moving objects, twirling spinners, and dropping food from the high chair, intrigued by the effects these actions produce.

Science in the early years should be an extension of these natural behaviors. Rich sensory experiences (seeing, hearing, tasting, touching, and smelling) can help children become more observant and curious. Exploring the characteristics of objects and living things can help them learn how to classify. By playfully interacting with their environment, children understand how they are distinct from the world around them and how they can influence aspects of it.

Science begins for children when they discover that they can learn about the world through their own actions, such as blowing soap bubbles, adding a block that causes a structure to collapse, or refracting light through a prism. A child best learns to swim by getting in the water; likewise a child best learns science by doing science. Hands-on science experience, together with conversations about what is occurring, is the best method for developing children's science skills. These experiences go beyond improving science skills to improving reading skills,
language skills, creativity, and attitudes toward science. Fortunately, most children enjoy these hands-on science experiences.

**Science at Home and in Your Community**

There are many activities you can do with children to help them develop skills related to science. Opportunities for positive science experiences can be found in kitchens, yards, parks, science museums, beaches, nature centers, and even toy boxes. While many aspects of science are intricate and intellectually demanding, it is important to remember that often the simplest experiences produce the most profound learning.

Here are some general guidelines parents can follow when exploring science with their children:

- **Introduce children to stimulating environments.** Oceans, swamps, backyards, parks, airports, bathrooms, and even kitchens offer chances for observing and discussing science. Provide children with situations that encourage playful exploration, a natural way to learn.
- **Choose stimulating toys.** A child's intellectual and social development is not related to the number of toys or materials at hand but to the *kinds* of toys and materials. Children develop better skills if their toys are varied and educational. The more things a child can do with a toy, the more likely the toy will teach him something. Children can engage in many creative, constructive, and thought-provoking activities with toy building materials, for example.
- **Become involved in your children's science interests.** Identify aspects of science that children enjoy. Fuel those fires. Talk to children about their science interests and encourage their efforts. If dinosaurs intrigue them, read dinosaur books, discuss dinosaurs, construct dinosaurs, and visit museums to see dinosaur fossils and models. Your understanding of a child's abilities will help you personalize his learning experiences.
- **Seize teachable moments.** A child sees a beautiful tulip bloom in the spring and asks about it. Use that opportunity to discuss flowers and bulbs. Follow up by planting bulbs or flower seeds and watching them grow. The home environment is familiar to children and fosters many teachable moments.
- **Provide hands-on experiences.** Not only are hands-on experiences a great way to learn, they are also a great way to get children excited about science. Find activities that challenge but don't frustrate a child. The best way to tell if an activity is appropriate is to see if the child appears interested while doing it. If a child does not seem interested in a particular activity, suggest another or try it again at another time. Keep children's natural yearning for learning burning by engaging them in motivating activities and not forcing them to do something they are not interested in doing.
- **Share your science interests.** If you have a science-related job or hobby, such as keeping a fish tank, repairing cars, or feeding birds, share the excitement. Nothing is as contagious as honest enthusiasm. Do activities together.
- **Bridge from the media.** Movies, television specials, magazines, newspapers, books, and computer programs frequently present science-related topics. Talk with children about the science they encounter. What did they find interesting?
- **Set aside time to talk.** One of the key components of all these guidelines is discussion, which is a powerful tool for making children think and refocus their ideas. Doing one activity with discussion, either before, during, or after, is better than doing four activities with no discussion. In fact, a powerful predictor for determining if a child will attend college is whether or not the family eats dinner together in a setting that promotes talk.

Encourage children to talk at meals, on outings, and during activities. The effort to communicate forces children to construct thoughts, form concepts, and examine relationships among ideas. The measure of a good discussion is not how much an adult explains to a child but how much it induces the child to think.

**Science Connections: Home and School**

Research has shown that students at all grade levels do better work in schools, feel better about themselves as learners, set higher goals, and dream bigger dreams when their parents are knowledgeable, supportive, encouraging, and involved in their education. Parent involvement can take a variety of forms, including volunteering at the school, making a presentation to a class, chaperoning field trips, supplying materials. The most important type of involvement, however, is encouraging, monitoring, and helping children with their schoolwork. When parents and schools work together, children grow in an environment of consistent expectations and shared purpose.

**Conclusion**

Helping children gain skills for understanding their world will enhance their success in science. Being excited about children's science interests can promote further growth and quests for knowledge. Exposing children to personal science-related interests, providing hands-on opportunities for exploring, and using experiences as a springboard for discussion builds skills and fosters enthusiasm for science. ECT

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