



Early Childhood NEWS

Look, Think, Discover: Adding the Wonder of Science to the Early Childhood Classroom

By Margaret Allen, Ph.D.

Exploring science is an exciting and wondrous part of early childhood. Innately curious, young children seek to investigate and discover "how their world works." They question; they look; they listen; they talk about their findings. They investigate the passage of light through various materials; how insects crawl on the ground; and what sinks, what floats, and why!

As teachers, we need to acknowledge and foster young children's natural abilities and curiosities as we develop their scientific thinking. Although young children may not understand complicated and abstract principles, they can wonder, explore, and discover ideas about plants, animals, and other objects in their environment.

To carry out their scientific "wonderings," children need time to explore and discover scientific concepts in risk-free, playlike settings such as exploration centers, investigation stations, or discovery centers. It is through these repeated experiences involving interaction with people and materials—the physical and social environments—that children construct their own knowledge (Piaget, 1952; DeVries & Kohlberg, 1990). When children are interacting with materials, observing, questioning, thinking, making predictions, and experimenting to confirm their ideas in a meaningful setting, they are making maximum use of the brain's capacity for learning (Bredenkamp & Rosegrant, 1993).

With these implications in mind, how do teachers best accomplish this brain-based approach to science in early childhood? What types of science explorations do young children need? What are some easy-to-implement science activities? What resources are available to help teach science to young children? The answers to these questions and more are described in the following sections.

Types of Science Explorations

Science in early childhood encompasses life science, earth science, and physical science. With the preceding information in mind on how children learn best, the following activities represent meaningful exploration teachers and children may want to try. (Specific guided lessons and activities were adapted from *Dr. Maggie's Play and Discover Science*, permission granted by Dr. Maggie and Creative Teaching Press.)

Life Science

Life science includes the exploration of the senses, of living and non-living things, plants and animals (including humans), their features, characteristics, and classifications.

Theme: Seeds, Plants, & Insects Sample Teacher-Guided Lesson: Seeds

Display seed packets or bags for children to examine. Ask what they notice (e.g., seeds come in different colors, shapes, and sizes). Extend on each child's comment by asking another open-ended question. Then, place a mixture of seeds on a small tray. Have children sort them by size, color, and shape, and then try to match the seeds with the fruit or vegetable packets from which they came. Some seeds (corn and beans) are easy to match because they look like the vegetable they become. Others (radish, melon, orange) are more difficult to match unless children have eaten the fruits and observed their seeds. Next, provide assorted fruits and vegetables or ask children to bring them from home. Students can search for and extract the seeds from the fruits and vegetables and use them for their own independent investigations.

Insect Activity: Can You See Me?

To help children understand how a caterpillar's natural camouflage makes it hard to see and offers it protection, place a penny on dark brown paper, and stand a few feet away. Is the penny easy to see? Then provide children with various shades of green, brown, and black construction paper to make natural

background scenery (e.g., leaves, grass, trees, vines) or collect real leaves, etc., and glue them onto construction paper. Children draw and cut out a caterpillar from one of the colors and glue it onto the scene. When dry, display camouflage scene and see if classmates can pick out hiding caterpillars.

Life Science Center for Independent Investigations

Place assorted live plants, and a collection of baskets filled with dried grass, leaves, vines, and bark in the center along with books and charts of plants and insects. Provide a variety of seeds, cups, spoons, and soil. Collect caterpillars and other insects along with small portions of their natural habitat and food for daily

study and then release. Provide children time to plant seeds, study the plants and insects, look them up in resource books, sketch them, compare and contrast them, and talk about their findings.

Earth Science

Included in earth science are the exploration of air and water, sand and soil, day and night, and the seasons.

Theme: Water Wonder Sample Teacher Guided Lesson: Sink or Float?

Provide a pan of water, toothpicks, craft sticks, tongue depressors, and modeling clay. Invite children to try each wooden stick to determine if it floats or sinks. Then, have them roll clay balls in graduated sizes from very tiny ones to two-inch balls. After formulating predictions, test and then discuss what happens to each ball when tested. Ask, "Does it sink or float? Why?" Allow children to reflect on their experiences and observations. Next, have children attach the various clay balls to sticks of each size to investigate what happens when something that does not float (e.g., a large clay ball) is attached to something that does (e.g., a toothpick). Then, have children mold the various clay balls around the different sticks to see if they can make the sticks float upright in the water. Invite children to explore what size stick and what amount of clay will permit each stick to float and at what point each begins to sink.

Water Activity: Ball or Boat—Which Will Float?

Children can work in pairs with clay. Have one child make a clay ball and another make a hollow clay boat. They can make predictions before placing the clay objects on the water simultaneously. Discuss results. Lead children who have prior experience with swimming and floating to compare what happened to the clay ball and boat when they jumped into water curled up like a ball or when they stretched out and remained still on the water's surface.

Earth Science Center for Independent Investigations

Provide each group of children with a small container of water, manipulatives (e.g., keys, marbles, paper clips, crayons, pennies, twigs, leaves, plastic straws), and an observation chart divided in half with the words sink or float and a corresponding picture of something sinking and something floating. Invite children to make predictions, test objects, and then record their observations on the chart using words and pictures to write about their findings.

Physical Science

Physical science includes the study and description of matter, of energy, movement, and change. Theme:

Magnets Sample Teacher-Guided Lesson: Mighty Magnets

Display assorted art supplies (e.g., glue, stapler with staples, tape, paper clips, rubber bands, rubber cement). Glue two pieces of paper together and ask: "What makes these pages cling together? What else can hold paper together, temporarily or permanently?" Provide time for children to look at the art supplies, think, and respond. Explain that some objects hold together without glue, staples, or tape. They seem to hold together all by themselves. Show assorted magnets (e.g., bar, horseshoe, and button magnets; magnetic wands and marbles), and ask volunteers to select one to dip into a container of assorted thumbtacks and paper clips. Provide time for the children to describe what happens. Ask volunteers to select a magnet and attempt to pick up objects from a tray of manipulatives (e.g., hairpins, plastic straws, toothpicks, scissors, pencils, crayons, brads, buttons, keys, seashells, pebbles). Talk about each object and whether or not it is attracted by the magnet. Have children sort the objects into attract and not attract piles. As they look at the piles ask children what they can conclude about magnets (that they attract objects made of metal).

Magnet Activity: Magnet Power!

Invite children to test magnetic attraction further by trying to attract paper clips through other matter (e.g., a plastic plate, a piece of cloth or paper, a wooden block). Children can discuss and record their findings with words or drawings in their science journals. Using probing questions with time for children to think and respond, help children conclude that a magnet can attract metal through matter.

Physical Science Center for Independent Investigations

Provide different magnets such as a magnetic wand, a bar magnet, a magnetic marble, and a magnetic button (from craft stores) and a box of paper clips. Children predict how many clips each magnet will attract and then discover how many clips are attracted to their magnets by experimenting with each. Children count and write or draw the number of clips attracted to their magnets and then compare results and discuss: "Which magnet attracted the most clips? Which magnets were stronger, more powerful? Which were weaker?" Conclusion It takes time for logic and reasoning to develop in young children. By using a combination of child-oriented lessons and open-ended exploration activities, teachers can help children develop into scientific thinkers and in doing so make learning experiences not only meaningful, but FUN! Although some teachers do not feel confident in their science know-how or think their classroom is adequately equipped with appropriate materials (Kenler 1996) the activities and resources provided in this

adequately equipped with appropriate materials (proper, 1999), the activities and resources provided in this article should help all teachers recognize that they can do science and do it well.

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Literature and Resources for Life Science

- The Bottle Garden*. Sandra Iverson. The Wright Group.
- Grow and Learn With Mister Rogers: Discovering Nature*. Creative Teaching Press.
- I'm a Seed*. Jean Marzollo. Scholastic.
- Look Once Look Again Series: In a Tree*. David M. Schwartz. Creative Teaching Press.
- See How It Grows*. Kimberlee Graves. Creative Teaching Press.
- A Seed Is a Promise*. Claire Merrill. Scholastic.
- Sunflower Seeds*. Joy Cowley. The Wright Group.
- Terry and the Caterpillars*. Millicent E. Selsam. Harper and Row.
- The Very Hungry Caterpillar*. Eric Carle. Philomel.
- We Can Eat the Plants*. Rozanne Lanczak Williams. Creative Teaching Press.
- Young Discoverers: Butterflies, Bugs, and Worms*. Sally Morgan. Kingfisher.

Literature and Resources for Earth Science

- Do-It-Yourself Science Books: All About Water*. Melvin Berger. Scholastic.
- I Am Water*. Jean Marzollo. Scholastic.
- It's Melting!* Rozanne Lanczak Williams. Creative Teaching Press.
- The Science Book of Water*. Neil Ardley. Harcourt Brace
- What Happened?* Rozanne Kanczak Williams. Creative Teaching Press.

Literature and Resources for Physical Science

- Do-It-Yourself Science Books: All About Magnets*. Melvin Berger. Scholastic.
- Experiments With Magnets*. Helen Challand. Children's Press.
- Magnets*. Janice VanCleave. John Wiley and Sons.
- My First Batteries and Magnets Book*. Jack Challoner. Dorling Kindersley.
- My First Science Book*. Angela Wilkes. Alfred A. Knopf.
- My Magnet*. Robert Pressling. Gareth Stevens Publishing.



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