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# SCIENCE at the CENTER of the Integrated Curriculum

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## 10 Benefits Noted by Head Start Teachers

- 1. Science responds to children’s need to learn about the world around them.** The primary reason for a science-based early childhood curriculum is that children love it. Disruptive behavior diminishes as children become engaged in explorations. Conversation and cooperation increase as children talk with one another about their predictions, observations, and questions.
- 2. Children’s everyday experience is the foundation for science.** For example, the concept and process of ‘change’ can be explored by making scrambled eggs. Children know what raw and scrambled eggs look like, but may have never watched the transformation take place. Focusing on the process of cooking the egg offers a new way of considering familiar objects and events and provides a meaningful context within which to introduce new vocabulary and science concepts.
- 3. Open-ended science activities involve children at a wide range of developmental levels.** Within any classroom activity, there are a variety of levels at which children can engage, depending on their prior knowledge and skills. For example, when using water-droppers to mix colored water, one child may spend 20 minutes practicing the small-motor skills for operating a water-dropper while another child spends an equal amount of time exploring how to use proportions to create different shades of orange. Because children can find their own level within an activity, they are challenged without becoming frustrated or bored.
- 4. Hands-on science activities let teachers observe and respond to children’s individual strengths and needs.** As teachers observe children finding their own level within an open-ended activity, they can become more aware of what the child knows and what she may need some assistance with. For example, the child who practiced small motor skills with a water dropper may enjoy more tasks to strengthen that skill or may be ready to repeat the activity at a higher conceptual level (that is, focusing on creating colors).
- 5. The scientific approach of “trial and error” welcomes error—interprets it as valuable information, not as failure.** Achievement increases when children are free to focus on learning rather than on avoiding mistakes.
- 6. Science strongly supports language and literacy.** Children learn language through participation in meaningful, comprehensible language-based interactions. Appropriately implemented, a science-based curriculum is rich in language use by both adults and children. Literature of all kinds can be used to support a science-based curriculum. Songs, finger-plays, poems and books can be matched to the activity and used to support it.
  - 6A.** Nonfiction books become a powerful foundation for conversations with adults and peers (Look what the inside of a frog looks like! How can people stay warm if they live in an igloo?).

**6B.** Vocabulary growth is supported by children's prior knowledge/experience of the everyday world, coupled with observation and hands-on activities. For example, a child who has watched her father make scrambled eggs has prior knowledge that she can draw on to interpret a hands-on classroom experience of cracking and heating eggs. This knowledge and the present experience provide a meaningful situation to support the child's learning of new vocabulary, perhaps words such as *raw, yolk, stir, cooked, spatula, heat, and change*.

**6C.** Receptive language (listening comprehension) is fostered as children listen to the teacher read aloud and talk about the science activity.

**6D.** Expressive language is fostered as the teacher leads children through a cycle of scientific reasoning and especially as the teacher supports the children in developing a report of their findings.

**7.** **Science helps English-language learners to participate in the classroom and learn English.** Teacher demonstrations and hands-on activities with familiar materials enable children who come from a home where English is not spoken to understand a great deal of the content without understanding the teacher's language. Their understanding of the situation helps them learn English.

**8.** The problem-solving skills of science easily generalize to social situations. Teachers can help children adapt the cycle of problem solving to interpersonal problems. They can help children to plan some possible solutions and to predict what might work best, then encourage them to try the proposed solution and let the teacher know how it

worked, and then help them try something else if the first attempt didn't work.

**9.** **Science demonstrations help children become comfortable in large-group conversations.** When the teacher makes orange by combining red and yellow, children are amazed and ask how and why it happened and what would happen if other colors were mixed. The teacher can support and extend a large-group conversation of this sort for several minutes, and then suggest ways for children to explore the questions they have generated. When demonstrations and discussions take place in a large group setting, the children all share the same experience and knowledge base; this creates a community of learners who can support one another's explorations, share new ideas on a topic, and challenge new theories generated.

**10.** **Science connects easily to other areas, including center-based play, math, artistic expression, and social studies.** With an integrated curriculum, related activities/concepts are explored in several locations in the classroom. This offers children an opportunity to learn using a variety of different senses and skills. For example, during a unit on color mixing, children might find net capes in primary colors in the housekeeping corner (these can be layered to create secondary colors), two primary colors at the easel with a model of various shades of the resulting secondary color, and, at the science table, strips of colored cellophane and clear contact paper to create plaid sun-catchers.

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