
Appendix VI

Importance of Science and Engineering in Early Education

Science and engineering are key components of early education (birth to age eight), and a natural focus for young children who are beginning to develop their own understandings of the world and how it works. By introducing children to science and engineering at a young age, we support their curiosity, promote their understanding, and give them the tools they need to investigate, design, observe, and draw evidence-based conclusions about the world. Children who are able to think critically, solve problems, and base their ideas on evidence at an early age will have a strong foundation as they engage with a world that is increasingly rooted in science, technology, and engineering.

Young children are predisposed to doing and learning science and engineering. For them, it is a form of high-level exploratory and constructive play that supports their critical thinking skills, problem-solving abilities, and their social and emotional development. Much like scientists and engineers, children want to make sense of the world and solve problems they see around them. Young children ask “how” and “why” and “what if” questions about everything around them and are naturally inclined to explore potential answers to their questions using all their senses. To build on their natural curiosity, young children should be exposed to different scientific contexts and concepts to help them refine and construct their thinking. This can be reinforced when science and engineering are accessible and engaging, modeling interest, wonder, and enthusiasm.

Educators of young children can effectively support good science and engineering by engaging them in science and engineering practices. Allowing children to pose questions and problems, and helping them expand on ways to begin to answer those questions and solve those problems, gives students the opportunity to be active participants in their own learning. Educators can give children varied opportunities to engage in science and engineering practices and concepts, such as through hands-on investigations, design projects, centers, literacy, and extended studies of natural phenomena. Such approaches foster development of scientific and technical reasoning because it is connected to their own experiences.

Science and engineering can also provide a compelling context for young children to learn literacy and mathematics. Science and engineering experiences offer contexts to form the foundations of reading, writing, speaking and listening, and language development. Young children encounter new vocabulary, begin to use language in a variety of ways, create visuals to clarify ideas, and participate in collaborative conversations with diverse partners to generate explanations and solutions. Science and engineering also require the use of applied mathematics. Young children begin counting and quantifying numbers and exploring shapes and the relationships among them. Integrating science and engineering with literacy and mathematics engages children with the idea that the disciplines work in conjunction with each other and builds a strong foundation as they advance to later grades with more complex concepts and practices.

Aside from furthering academic development, science and engineering build young children’s identity as scientists and engineers. Their curiosity and need to make sense of their environment make science and engineering exciting and engaging parts of the early childhood experience. Engaging curricula and instruction develop positive attitudes toward science and engineering and allows children to develop knowledge and skills that will guide and enrich their lives. Allowing children to explore the natural and

human-made world through relevant experiences, in and out of the classroom, supports their use of science and engineering to understand and interact with the world.

Resources

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