Science in Early Care and Education: Research-to-Policy Resources

Science is increasingly being recognized as a critical domain in early childhood education. Children display a natural curiosity about their surroundings and research demonstrates that children entering school have considerable knowledge of the natural world and have the capacity to think conceptually and begin to develop scientific reasoning skills (National Research Council, 2007). Building on this natural interest and creating early experiences that foster investigation promotes children’s ability to engage in scientific inquiry. Further, research indicates that children who engage with science from an early age develop positive attitudes towards science which in turn relates to their later science achievement and increases the likelihood that they will pursue a career in science (McClure et al., 2017). A recent study also found that children’s kindergarten knowledge of physical, social and biological sciences predicted their first-grade knowledge of these topics which in turn predicted their science achievement from third to eighth grade (Morgan, Farkas, Hillemeier, & Maczuga, 2016). Therefore, early science experiences play a significant role in children’s later learning. Additionally, incorporating science into early education is particularly important given that research has demonstrated that children from different socioeconomic backgrounds enter kindergarten with considerable differences in science and math knowledge and that these differences can continue and grow over time (Early Childhood STEM Working Group, 2017).

In defining science education for young children, a report from the National Academy of Sciences highlights the importance of focusing on scientific exploration and inquiry rather than on facts and information (Institute of Medicine (U.S.), & National Research Council (U.S.), 2015). As the report notes, engaging children in scientific inquiry not only supports their knowledge of science but also supports school readiness in other domains such as mathematics, and language and literacy. One paper on science in early childhood classrooms defines scientific inquiry as a process “involving prediction, planning, collecting, and recording data; organizing experiences; and looking for patterns and relationships that eventually can be shared and from which new questions may emerge” (Worth, 2010, p. 4). However, currently most young children are not exposed to high quality science experiences in the early childhood classroom as most early educators do not spend much time on science related activities whether planned or spontaneous (Nayfeld, Brenneman, & Gelman, 2011). One reason is that early educators often lack time, space, materials, as well as content knowledge and confidence in teaching.
science content and methods (Greenfield, Jirout, Dominguez, Greenberg, Maier, & Fuccillo, 2009). This lack of confidence may stem from inadequate preparation in early childhood preservice and in-service professional development programs, as many of these programs do not focus on preparing educators to provide science instruction (Brenneman, Boyd, & Frede, 2009). In order to ensure that scientific inquiry is integrated into the early childhood classroom there is a need to better prepare early childhood educators in science content, methods, and pedagogy.

This resource list identifies resources from 2010 to 2017 that highlight resources on science in early care and education under the following categories:

1) Policy resources
2) Promising practices
3) Professional development and teacher preparation

Policy Resources


Promising Practices


**Professional Development and Teacher Preparation**


References


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