OPEN-ACCESS WEB RESOURCES

Note: Many of these resources are available on the Early Childhood Learning and Knowledge Center (ECLKC) the web portal for the Office of Head Start found here: *https://eclkc.ohs.acf.hhs.gov*.

Effective Practice Guides: Cognition
https://eclkc.ohs.acf.hhs.gov/school-readiness/effective-practice-guides/cognition

> This guide shows what effective practices look like in early learning settings and helps staff reflect and improve their practices. In home-based settings, teaching practices are the ways that home visitors work with families to provide learning experiences, engage in responsive interactions, and use the home as the learning environment.

Practice-Based Coaching
https://eclkc.ohs.acf.hhs.gov/professional-development/article/practice-based-coaching-pbc

> These webpages provide information and resources, including videos, fact sheets, and written guides, to help coaches implement Practice-Based Coaching.

Learning and Teaching with Learning Trajectories
www.LearningTrajectories.org

> Learn about how children think and learn about mathematics and learn to teach mathematics to young children "their way" (birth to age 8). [LT]2 allows teachers, caregivers, and parents to see the learning trajectories for math. They'll view short video clips of classroom instruction and children working on math problems in a way that clearly reveals their thinking.

Teaching Math to Young Children Practice Guide
https://ies.ed.gov/ncee/wwc/PracticeGuide/18

> This website provides five evidence-based recommendations for teaching math to young children. The recommendations include implementation steps, which offer specific teaching practices for implementing each recommendation. Coaches, administrators, and teachers can use this guide to lead teachers in setting math teaching goals for evidence-based practices.

Practice-Based Coaching: Collaborative Coaching Partnerships
https://eclkc.ohs.acf.hhs.gov/sites/default/files/pdf/pbc-brief-ccp.pdf

> Practice-Based Coaching (PBC) focuses on improving teachers' use of evidence-based practices to support children's progress toward school readiness goals. This document provides information about collaborative coaching partnerships, a key element of PBC.

Component 1: Shared Goals and Action Planning
https://eclkc.ohs.acf.hhs.gov/sites/default/files/pdf/pbc-brief-sgap.pdf

> This resource is a review of Component 1 of the PBC cycle, Shared Goals and Actional Planning. Learn what Shared Goals and Action Planning are, its importance, and how to implement this component.

Component 2: Focused Observation.
https://eclkc.ohs.acf.hhs.gov/sites/default/files/pdf/pbc-brief-fo.pdf

> This resource is a review of Component 2 of the PBC cycle, Focused Observation. Learn about Focused Observation, their importance, and how to implement this component.

Component 3: Reflection and Feedback
https://eclkc.ohs.acf.hhs.gov/sites/default/files/pdf/pbc-brief-rf.pdf

> This resource is a review of Component 3 of the PBC cycle, Reflection and Feedback. Learn about Reflection and Feedback, its importance, and how to implement this component.

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Defining Mathematics Coaching
https://www.nctm.org/Handlers/AttachmentHandler.ashx?attachmentID=OoDpMTJGelA%3D

Mathematics coaches are well-versed in mathematics content and pedagogy. They work directly with classroom teachers to improve student learning of mathematics.

FREE VIDEOS

If you are interested in viewing videos of children's development and activities that provide differentiated support for children at varying levels of the trajectory, the Learning and Teaching with Learning Trajectories [LT]2 tool, described above, at *www.learningtrajectories.org*, houses many videos that show viewers what each developmental step looks like for many areas of math development and learning. This free web resource also includes instructional activities for small and whole groups.

BOOKS

Clements, D. H. & J. Sarama. 2014. *Learning and Teaching Early Math: The Learning Trajectories Approach*. New York, NY: Routledge.

This book describes the learning trajectory approach to teaching young children mathematics. It describes the developmental progression as well as instruction for activities at each level.

Germeroth, C. & J. Sarama. 2017. "Coaching in Early Mathematics." In J. Sarama, D. Clements, C. Germeroth, & C. Day-Hess (Eds.), *The Development of Early Childhood Mathematics Education* (pp. 127-167). Cambridge, MA: Elsevier. Can be retrieved at: *https://www.sciencedirect.com/science/article/pii/S0065240717300174.*

This chapter describes coaching models and abstract characteristics of effective coaching. It provides an in-depth view of the coaching aspect of two large empirical studies in early mathematics. It introduces the theoretical framework from which the coaching models were developed and describes the research on which they were based. Although the coaching models were not Practice-Based Coaching, they shared key characteristics including shared decision making between teacher and coach and cycles of goal setting, observation, and reflection. It summarizes how the planned models were instantiated and challenges to their implementation within each project.

Sarama, J. & A. M. DiBiase. 2004. "The Professional Development Challenge in Preschool Mathematics." In D. H. Clements, J. Sarama, & A. M. DiBiase (Eds.), *Engaging Young Children in Mathematics: Standards for Early Childhood Mathematics Education* (pp. 415–446). Mahwah, NJ: Erlbaum.

This chapter discusses professional development, specifically regarding early childhood math. First, the authors review background information on professional development, including present barriers to implementing effective professional development, principals and standards for early childhood math, and theoretical foundations. Then the authors review the literature on professional development in early childhood, math education, early childhood math education, and technology. They conclude by drawing implications and providing recommendations for professional development focused on teaching early childhood math.

The National Association for the Education of Young Children (NAEYC)
https://www.naeyc.org/resources/topics/coaching

The National Association for the Education of Young Children (NAEYC) is a professional membership organization that works to promote high-quality early learning for all young children, birth through age 8, by connecting early childhood practice, policy, and research. They provide a multitude of resources to ensure appropriate professional learning experiences for early childhood educators.

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PEER-REVIEWED ARTICLES

Cataldo, Penny. 2013. "From Classroom to Coach: One Teacher's Journey." *Teaching Children Mathematics* 20: 110-115. 10.5951/teacchilmath.20.2.0110.

Geist, E. 2015. "Math Anxiety and the 'Math Gap': How Attitudes Toward Mathematics Disadvantages Students as Early as Preschool." *Education* 135(3): 328-336.

Kraft, M. A., D. Blazar, & D. Hogan. 2018. "The Effect of Teacher Coaching on Instruction and Achievement: A Meta-Analysis of the Causal Evidence." *Review of Educational Research* 88(4): 547–588. *https://doi.org/10.3102/0034654318759268*.

Lake, V. E., & L. Kelly. 2014. "Female Preservice Teachers and Mathematics: Anxiety, Beliefs, and Stereotypes." *Journal of Early Childhood Teacher Education* 35(3): 262–275. https://doi.org/10.1080/10901027.2014.936071.

Markussen-Brown, J., C. B. Juhl, S. B. Piasta, D. Bleses, A. Hojen, & L. M. Justice. 2017. "The Effects of Language- and Literacy-Focused Professional Development on Early Educators and Children: A Best-Evidence Meta-Analysis." *Early Childhood Research Quarterly* 38: 97–115. *https://doi.org/10.1016/j.ecresq.2016.07.002*.

National Research Council. 2009. "Mathematics Learning in Early Childhood: Paths Toward Excellence and Equity." Washington, DC: National Academy Press. *https://doi.org/10.17226/12519*.

Pantoja, N., C. S. Rozek, M. W. Schaeffer, T. Berkowitz, S. L. Beilock, & S. C. Levine. 2019. "Children's Math Anxiety Predicts Future Math Achievement Over and Above Cognitive Math Ability." Paper presented at the 2019 SRCD Biennial Meeting, Baltimore, MD.

Schaeffer, M. W., C. S. Rozek, T. Berkowitz, S. C. Levine, & S. L. Beilock. 2018. "Disassociating the Relation between Parents' Math Anxiety and Children's Math Achievement: Long-Term Effects of a Math App Intervention." *Journal of Experimental Psychology: General* 147(12): 1782-1790. https://doi.org/10.1037/xge0000490.

Thomson, S., Rowe, K., Underwood, C., & Peck, R. (2005). Numeracy in the early years: Project Good Start. Retrieved from Australian Council for Educational Research website: *http://www.acer.edu.au/documents/GOODSTART_FinalReport.pdf*

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