

Reconsidering students' assets in mathematics: A spatial reasoning approach for young children

TMERC.CA

Math for Young Children

The Math for Young Children research project has been in progress since 2011. Our goal is to investigate young children's mathematics (Kindergarten-Grade 2), with a particular focus on spatial reasoning. The M4YC website is designed as a resource for early primary teachers, and contains research backgrounds as well as lessons, photos, video and full lesson study packages from teacher teams involved in the M4YC lesson study research.

Spatial reasoning, involves the location and movement of objects and ourselves, either mentally or physically, in space.

Instruction

Teacher-initiated, carefully selected learning opportunities, often involves teacher modeling and highlighting mathematics thinking for collective knowledge building.

Structured problem play

Student initiated play with mathematics ideas and materials where the teacher introduces enabling constraints; may involve student initiated variations

PLAYING WITH MATH IDEAS

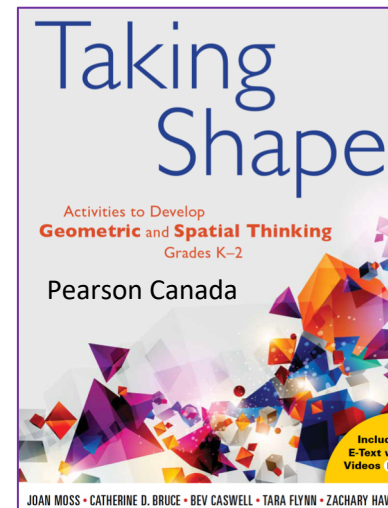
Guided play

Teacher-initiated and monitored learning situations that make mathematics thinking visible, enabling the teacher and students to explore, interact and reflect meaningfully with mathematics ideas.

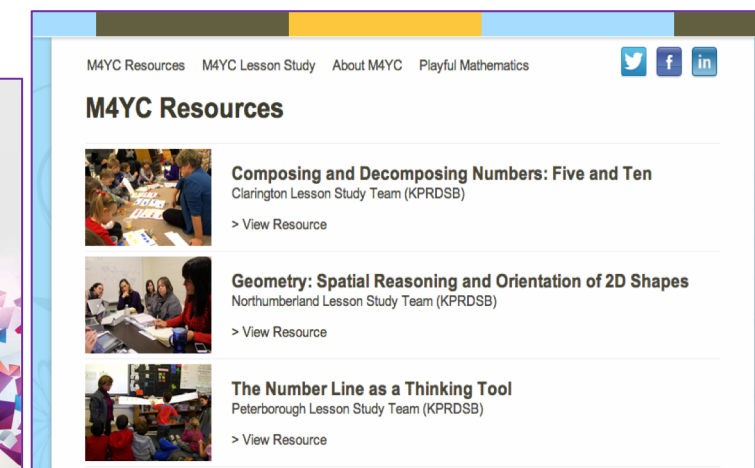
Free play

Unguided child-initiated creative or imitative play with no imposed structures or expectations from the teacher; involves students integrating their emergent understandings through play.

Bruce & Flynn 2013-2017, and linked to play research by Baroody



<http://www.mathforyoungchildren.ca/>



Sample teacher interview quotes:

"Children's capability is huge. You sometimes think they can't do that, they're too young...how many times have they surprised me when we thought it would be a challenge and it wasn't. They surprise you."

"...So before, it was very basic, just knowing the shapes and positional words. And it turns out there's this whole other world of activities and things that children can do, that they're very capable of doing...so why weren't we doing it before?"

Spatial Reasoning...

...and mathematical thinking are intricately linked. (Geary, 1996; Dehaene, 1997; Mix & Cheng, 2012; Cheng & Mix, 2013; Verdine et al., 2014)

...is an important predictor of success in mathematics and in STEAM careers. (Wai, Lubinski & Benbow, 2009; National Research Council, 2009; Newcombe, 2010, 2013; Gunderson, Ramirez, Beilock & Levine, 2012; Farmer et al., 2013; Verdine, Irwin, Golinkoff & Hirsh-Pasek, 2014)

...can be improved. (Uttal et al., 2013)

