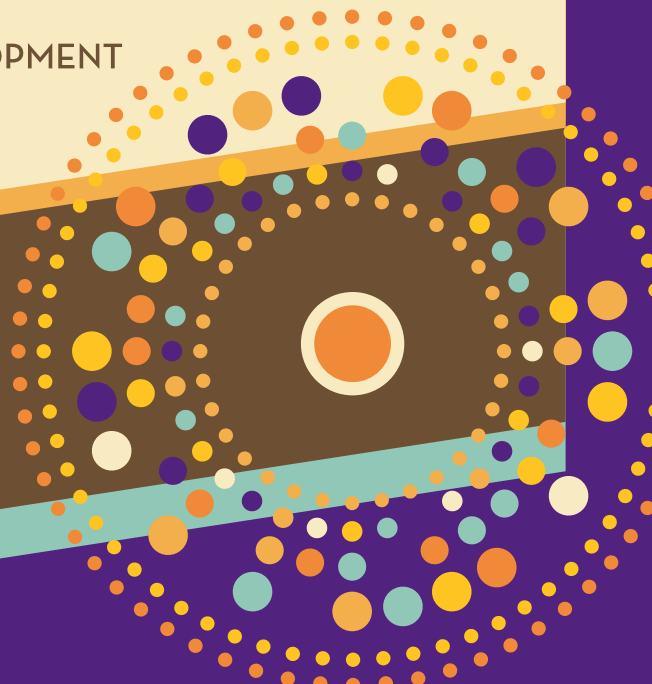
MAKING SENSE OF MATHEMATICS AND TEACHING 9-12

PROFESSIONAL DEVELOPMENT



MAKING SENSE OF MATHEMATICS AND TEACHING 9-12

***Making Sense of Mathematics and Teaching* (9-12) professional development courses are offered through the Center for Teaching and Learning Mathematics at the University of Northern Iowa. These courses provide innovative mathematical professional development designed to directly improve teacher practice and enhance student learning.**

Our courses are designed to deepen high school mathematics teachers' understanding of mathematical and pedagogical concepts and to support their implementation of research-based teaching strategies. UNI faculty and mathematics consultants provide expertise to further participants' growth as mathematics educators.

All courses are aligned with the Common Core State Standards for Mathematics including both content and practice.

FOUNDATIONAL RESEARCH

***Making Sense of Mathematics and Teaching* (9-12)** courses reflect the importance of effective and innovative mathematics instruction and the positive impact felt by students who are taught by highly effective and capable teachers. **Five significant bodies of research** guide us as we reach and expand the capacity of high school teachers and ultimately, impact student achievement:

The Common Core Standards for Mathematics, including both the Content Standards and the Mathematical Practice standards, and the Learning Progressions provide a firm foundation from which to build upon (Common Core State Standards Initiative, 2020).

The National Council of Teachers of Mathematics's Eight Effective Mathematics Teaching Practices are woven throughout the courses to support implementation of the Common Core Standards for Mathematics (NCTM, 2014).

These courses incorporate the **Principles for the Design of Mathematics Curricula:** Promoting Language and Content Development from Understanding Language from the Stanford Center for Assessment, Learning and Equity to support the interdependent nature of mathematical sense making and the use of disciplinary language (Zwiers, et al., 2017).

An overarching theme throughout the courses is the **development of mathematical growth mindsets**; using the research work of Jo Boaler and Carol Dweck is fundamental to the discussions on growth mindsets (Dweck, 2007).

Equity-based mathematics teaching looks through three lenses: reflecting, noticing, and engaging in community to then take a stand for what is right. Teachers must reflect on not only their classroom pedagogy but also on their own identities. They must also conscientiously notice students' mathematical thinking and personal identities. Finally, they must actively engage in both their classroom and teaching communities (NCTM, 2018).

COURSE OFFERINGS

(MSNAF)

Making Sense of Number, Algebra and Functions 9-12

develops conceptual understanding of number, algebra and functions through problem solving and reasoning to promote procedural fluency. The implementation focus is on the use of learning goals and high-quality tasks to guide instructional decisions which increase access and equity for all students (Boston, Dillon & Smith, 2017; Star et al., 2015; Cooney, Beckmann & Lloyd, 2010).

(MSGM)

Making Sense of Geometry and Measurement 9-12

develops conceptual understanding of geometry and measurement. Participants further develop a transformational approach to geometry which connects to other mathematical domains. The implementation focus is on classroom discourse through mathematical language routines (Sinclair, Skelin & Pimm, 2012; Boston, Dillon & Smith 2017; Smith, Steele & Sherin, 2020; Zwiers et al. 2017).

(MSSP)

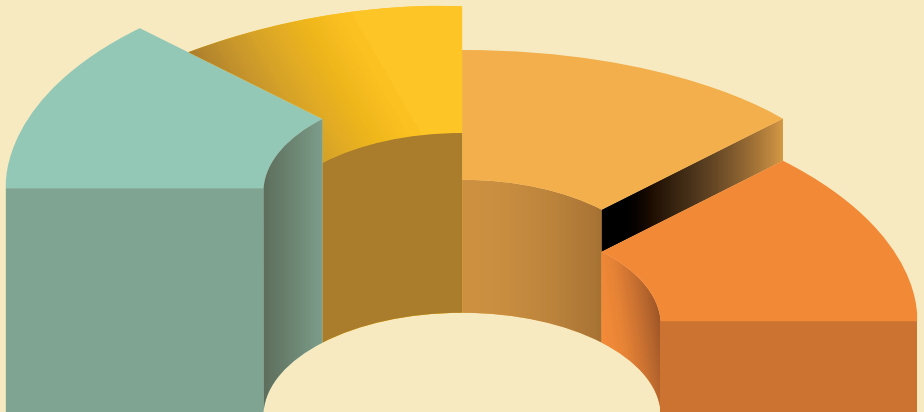
Making Sense of Statistics and Probability 9-12

develops conceptual understanding of statistical processes and analysis as well as probabilistic models. The implementation focus is on supporting productive struggle to develop a growth mindset (Peck, Gould, Miller & Zbiek, 2013; Boston, Dillon & Smith, 2017; Boaler, 2016).

(MSRP)

Making Sense of Reasoning and Proof 9-12

develops mathematical argumentation across mathematical domains. The implementation focus is on providing effective feedback to develop a growth mindset (Zwiers et al., 2017; Bieda, Knuth & Ellis, 2012; Boaler, 2016).



"In ambitious teaching, the teacher engages students in challenging tasks and then observes and listens while they work so that he or she can provide an appropriate level of support to diverse learners. The goal is to ensure that each and every student succeeds in doing high-quality academic work, not simply executing procedures with speed and accuracy."

Boston, Dillon, & Smith, 2017

CTLM CENTER FOR TEACHING AND LEARNING MATHEMATICS

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