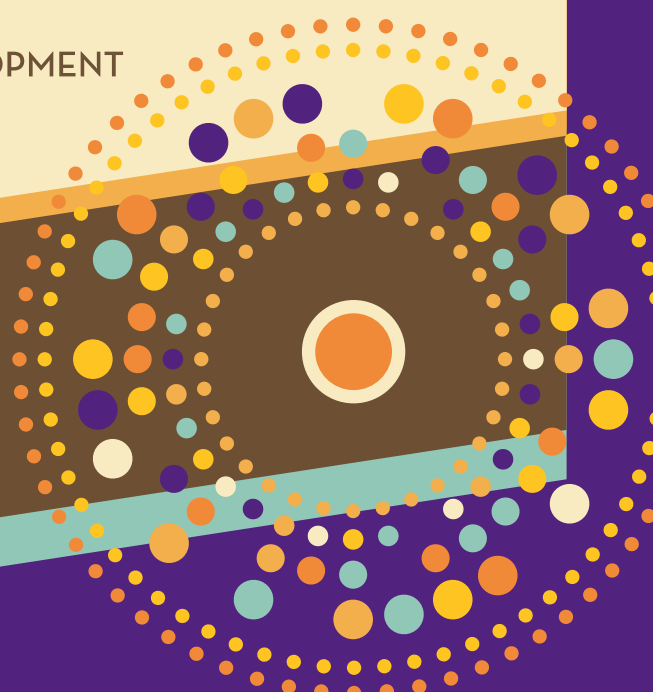
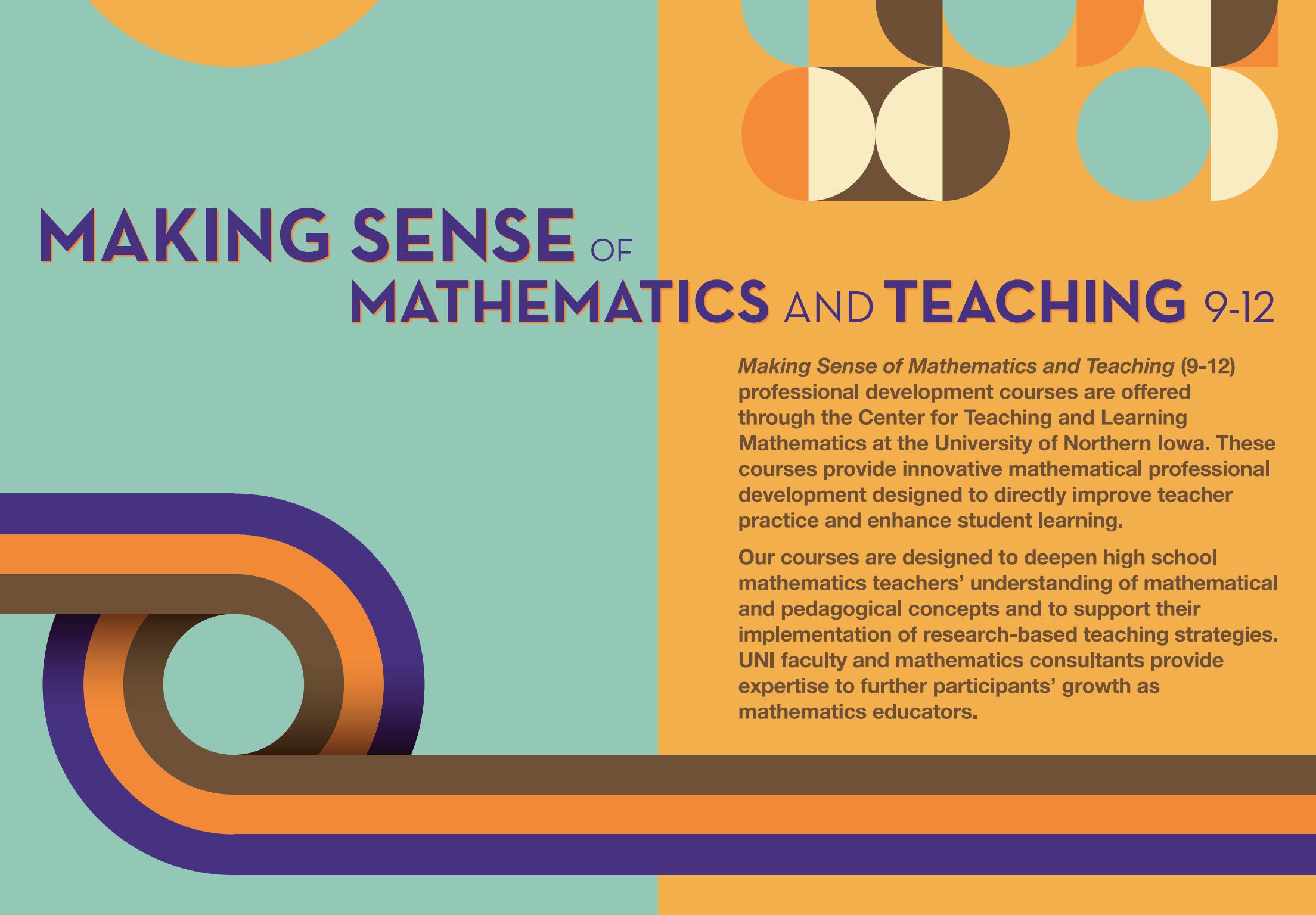




MAKING SENSE OF MATHEMATICS AND TEACHING 9-12

PROFESSIONAL DEVELOPMENT



The background features a light teal color on the left and a light orange color on the right. In the top right corner, there is a pattern of overlapping circles in teal, orange, and brown. In the bottom left corner, there is a large, stylized graphic of three concentric, overlapping loops in teal, orange, and brown. The main title is centered across the top, with 'OF' and 'AND' in a smaller font size.

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.

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:

National Council of Teachers of Mathematics Process Standards and the **National Research Council's** strands of mathematical proficiency provide a basis for the competencies and proficiencies important to effective mathematics teaching and learning. (NCTM, 2000; National Research Council, 2001).

The National Council of Teachers of Mathematics's eight Effective Mathematics Teaching Practices are woven throughout the courses to provide a framework for strengthening the teaching and learning of mathematics (NCTM, 2017).

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).

COURSE OFFERINGS

(MSNAF)

Making Sense of Number, Algebra and Functions 9-12

focuses on developing conceptual understanding of number, algebra and functions through problem solving and reasoning to promote procedural fluency. Participants use learning goals and high-quality tasks to guide instructional decisions (Boston, Dillon, & Smith, 2017; Star et al., 2015; Cooney, Beckmann, & Lloyd, 2010).

(MSGM)

Making Sense of Geometry and Measurement 9-12

focuses on developing conceptual understanding of geometry and measurement. Participants further develop a transformational approach to geometry which connects to other mathematical domains. Participants implement classroom discourse through mathematical language routines with 9-12 students (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

focuses on developing conceptual understanding of statistical processes and analysis as well as probabilistic models. Participants practice supporting productive struggle in 9-12 students to develop a growth mindset (Peck, Gould, Miller, & Zbiek, 2013; Boaler, 2016; Boston, Dillon, & Smith, 2017).

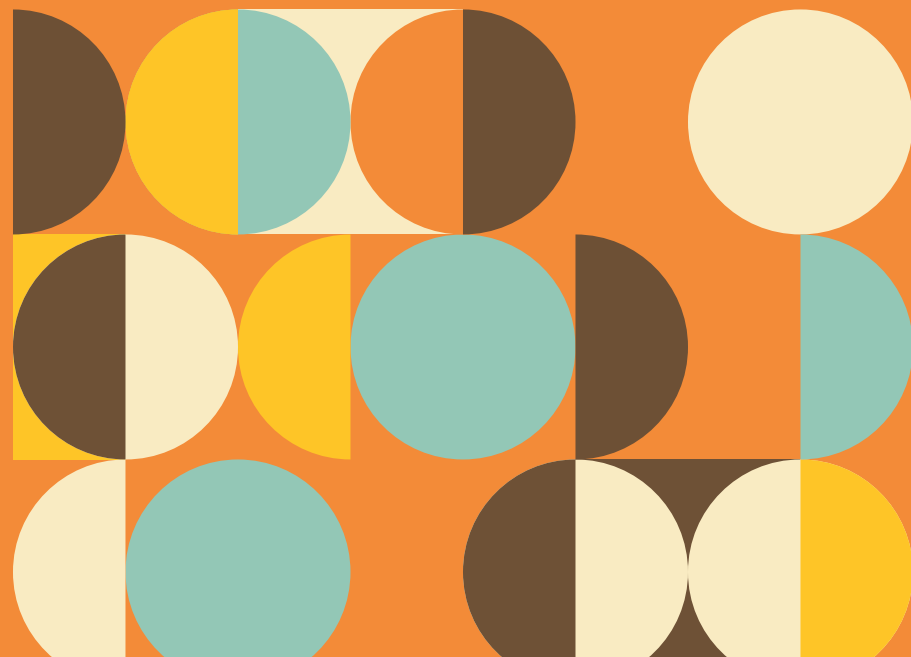
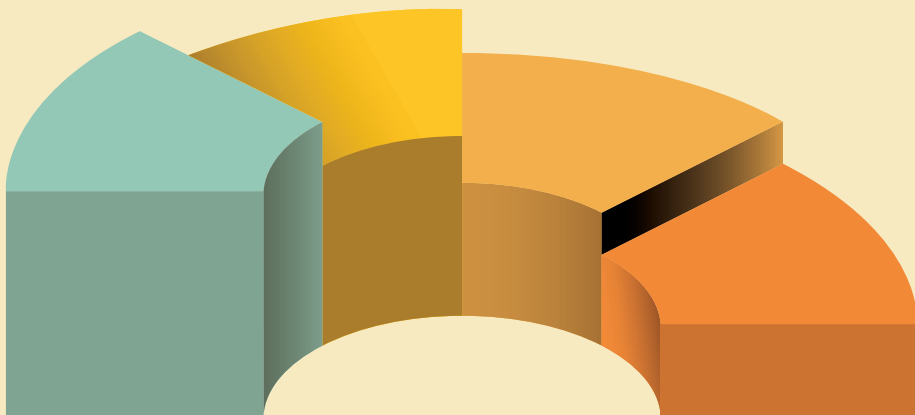
(MSRP)

Making Sense of Reasoning and Proof 9-12

focuses on developing mathematical argumentation across mathematical domains. Participants practice providing effective feedback to develop a growth mindset with 9-12 students (Bieda, Knuth, & Ellis, 2012; Boaler, 2016; Zwiers et al., 2017).

“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



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