Wisconsin Foundations for Mathematics

Wisconsin's Guiding Principles for Teaching and Learning provide important guidance for the mathematics classroom. Within the discipline of mathematics, each of the six principles has specific implications for equity, pedagogy, instruction, and assessment. Mathematics educators should consider how the six guiding principles influence their teaching.

The following foundations provide direction for the teaching and learning of mathematics in Wisconsin.

Every student must have access to and engage in meaningful, challenging, and rigorous mathematics.

Equity in mathematics education requires recognition that the standards must be kept consistent while being flexible in instructional approach and methods of assessment to accommodate the strengths and weaknesses of all students. In order to optimize student learning, the high bar that is set for all should not be moved for some students; instead, the delivery system must be varied to allow access for all. Schools and classrooms need to be organized to convey the message that all students can learn mathematics and should be expected to achieve. Effective mathematics classroom practice involves assessing students' prior knowledge, designing tasks that allow flexibility of approach, and orchestrating classroom discussions that allow every student to successfully access and learn important mathematics.

When today's students become adults, they will face new demands for mathematical proficiency that school mathematics should attempt to anticipate. Moreover, mathematics is a realm no longer restricted to a select few. All young Americans must learn to think mathematically, and they must think mathematically to learn.

(Adding It Up, National Research Council, 2001).

Mathematics should be experienced as coherent, connected, intrinsically interesting, and relevant.

The PK-12 curriculum should integrate and sequence important mathematical ideas so that students can make sense of mathematics and develop a thorough understanding of concepts. The curriculum should build from grade to grade and topic to topic so that students have experiences that are coherent. The connections of mathematical ideas in a well-designed curriculum allow students to see mathematics as important in its own right, as well as a useful subject that has relevant applications to the real world and to other disciplines.

Problem solving, understanding, reasoning, and sense-making are at the heart of mathematics teaching and learning and are central to mathematical proficiency.

Using problem solving as a vehicle for teaching mathematics not only develops knowledge and skills, but also helps students understand and make sense of mathematics. By infusing reasoning and sense-making in daily mathematics instruction, students are able to see how new concepts connect with existing knowledge and they are able to solidify their understanding. Students who are mathematically proficient see that mathematics makes sense and show a willingness to persevere. They possess both understanding of mathematical concepts and fluency with procedural skills.

Effective mathematics classroom practices include the use of collaboration, discourse, and reflection to engage students in the study of important mathematics.

Collaboration and classroom discourse can significantly deepen student understanding of mathematical concepts. In addition to teacher-student dialogue, peer collaboration and individual reflection must also be emphasized. Representing, thinking, discussing, agreeing, and disagreeing are central to what students learn about mathematics. Posing questions and tasks that elicit, engage, and challenge students' thinking, as well as asking students to clarify their thinking and justify solutions and solution paths should be evident in all mathematics classrooms.