7 MATHEMATICAL PRACTICES

for emerging mathematicians in Montana

1 PROBLEM SOLVE AND PERSEVERE

2 ABSTRACT AND GENERALIZE

3 JUSTIFY AND PROVE

4 MODEL WITH MATHEMATICS

5 REPRESENT

6 COLLABORATE

7 CULTURALLY CONNECT

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1 Problem Solve and Persevere

Mathematically proficient students:

- make conjectures, plan, and follow solution strategies,
- evaluate their progress and accuracy,
- engage in sense-making and self-monitoring,
- persevere in seeking solutions, and
- value alternative approaches.

2 Abstract and Generalize

Mathematically proficient students are able to decontextualize and symbolically represent both mathematical and non-mathematical situations to search for and analyze regularities, patterns, and structures.

3 Justify and Prove

Mathematically proficient students create, evaluate, justify, and refute mathematical claims in developmentally and mathematically appropriate ways.

4 Model with Mathematics

Mathematically proficient students:

- Make sense of a scenario
- Identify a problem to be solved, and mathematize it, and
- Apply a mathematical model to reach a solution and verify its viability.

5 Represent

Mathematically proficient students:

- Recognize, use, create, interpret, and translate representations using appropriate methods and tools and
- Understand multiple ways of representing mathematical ideas and how they are related.

6 Collaborate Mathematically

Mathematically proficient students engage in mathematics as a social enterprise through discussion and collaborative inquiry where ideas are offered, debated, connected, and built upon toward solutions, shared understanding, and appreciation of other perspectives.

7 Culturally Connect

Mathematically proficient students:

- Recognize cultural connections and contributions to mathematics and
- Appreciate the role of mathematics in various cultural contexts, including those of tribally specific Montana Indigenous Peoples.

A mathematical practice standard is a specific statement that defines the how of student engagement in mathematical reasoning, problem-solving, communication, and collaboration (Harbin Miles & Williams, 2016). These standards describe expertise that mathematics educators at all levels should seek to develop in their students to support proficiency in mathematical thinking. Mathematical practice standards focus on the processes and practices students use to apply their mathematical knowledge flexibly, accurately, and efficiently across a variety of applications and scenarios (Harbin Miles & Williams, 2016). Designers of curricula, assessments, and professional development should connect the mathematical practices to mathematics content.

These practice standards have an implementation date effective July 1, 2026.

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